M'Bour
October 19,
1976

Staying at the ORSTOM station. Weather is cool and clear. Catch glimpses, en passant, of at least two Redbills ca. 9:00 a.m. In usual area. A few minutes later hear 3 series of "Whup" Notes. Does this indicate that the birds are breeding, or that elaborate vocalizations continue during the non-breeding season?

There are lots more Redbill "Whup" Note performances in the course of the morning. Rising to Double Notes occasionally. In the more or less usual fashion of the species.

No audible voices in early afternoon.

Go for drive along road to Joal later.

4:05 p.m. See single Pied on wires above (presumably) brackish inlet. Flies off when car stops.

Some distance further on, see another single Pied Kingfisher in similar situation.

There is also a single Lilac perched immobile on wires.

Plus 2 Redbills off in acacia forest. And sounds of Blackbill Whistle performances in neighborhood. And "Whup" Notes coming from another direction (not being uttered by the birds in view).

Another Lilac and several more Redbills further down road.

4:25. See single Abyssinian perched 6-8 ft up in acacia edge road. (Note: this is the apparently monospecific acacia forest that is so characteristic of the region.) Bird is silent and alone. Just looking down at ground. Presumably waiting for prey. Tail quivers occasionally. Probably action of wind. O photos. The bird flies off. Quite silent. Lands on wire approx. 15 ft up. Again its silent.

About 1/4 mile further on, we run into large numbers of birds. In or at the southern edge of a forêt classée (Nianing?). Scrubby acacia forest, rather broken up; large expanses of sand and pebble (an old road bed); a small (presumably fresh water pond); 2 sets of wires, one on each side of the road. Cultivated fields not far distant.

Arrive this area 4:25. Weather is clear. Some wind.

Most of the birds here are hornbills and rollers. There are 6 Abyssinians in the neighborhood (this number is pretty definite). Plus many Blackbills (probably 10-12 inds. all told). Plus 2 (or, more probably, 3) Redbills.

The Abyssinians are a usually dispersed group. Inds. are usually 5-100 yds apart from one another. Perched low in scrub, 4-10 ft up, up to the highest mores, perhaps 15 ft up. When undisturbed - which is not very often - the inds. sit quietly, mostly looking for prey on ground. Little or nothing in the way of flight int. movs. while actually perched. (Note: the species seems to pose differently from the Bluebellies, much less often in erect-V type-postures - neck often semi-"pulled in")

When we first arrive, there is a dispute between the Blackbills and the Abyssinians in full swing. Blackbills attacking the Abyssinians. Many attacks in close if rather irregular succession. By at least 3 Blackbills (probably more) on at least 4 Abyssinians. The Blackbills would fly up and make erratic "inhibited" passes or swoops at a perched or (rarely) flying Abyssinian. Passes and swoops usually followed by glides and/or semi-soars. These did not appear to be ritualized per se. As far as I could tell, all the Blackbills were quite silent during all attacks.

The reactions of the Abyssinians varied. Sometimes an ind. just sat stolidly. Sometimes it flinched. Sometimes it flew away. Sometimes it chased, and/or became involved in a dispute of some sort, with another ind. of the same species. Usually (not always) it also vocalized. All the vocs. seemed to be segments of a continuum, in much the same way as the corresponding and obviously strictly homologous patterns of Bluebellies. Sounds also harsh or hoarse, but not extremely "twanging". Perhaps less like the notes of Bluebellies in tone than are many of the vocalizations of Purpurs.

Obviously the lowest intensity notes, uttered quite frequently, especially when the general hubbub was less than usual, were "Arnh" notes. Sometimes utter singly. Sometimes in irregular series of indefinite length. Obviously homologous with the simple "Anh" notes

of Bluebellies.

When we first arrived, one Abyssinian was sitting on the ground, "swearing" steadily. Probably displaying toward the Blackbells, or after being attacked by a Blackbell. Possibly (also) threatening a neighboring Abyssinian. Swearing was a long sustained flow of "Arrh" type notes. Frequently interrupted but resumed again and again. Some of the notes apparently "single" but there was a definite tendency to group notes in doublets or triplets on occasion. — — or — — — I assume that these groupings were equivalent to, and homologous with, the singlet Chatters of Bluebellies and other species

At some stage in the process, one of the Abyssinians (perhaps the same ind.) flew rather excitedly from bush to bush. Several times uttered long growling "Rattles" in flight. Like very prolonged "rolling" Arrh notes. These sounds must have been high intensity.

Sometimes an Abyssinian would fly to chase or displace another ind. of the same species. Often, as mentioned above, in cases that suggested redirections. The aggressor in such attacks and chases sometimes uttered "Arrh" Notes. Usually quite typical, moderately long, "single" "Arrh"s. In moderately regular succession — — — — — — — ....

Once an Abyssinian flew to attack a neighbor, another Abyssinian, particularly vigorously, after being swooped at by a Blackbell. In this case, the aggressor Abyssinian "clattered" or snapped its bill, 3 or 4 times in rapid succession, as it took off. But then it did not vocalize

When not engaged in hostilities of one sort or another, the Abyssinians did a little feeding. Quite reminiscent of the Bluebellies. Occasional (not frequent) flights down to ground. No prey actually seen in bill. (I.E. prey items probably small). Once an ind. landed on the highway, hopped along several feet. Apparently looking for insects or other invertebrates. Apparently unsuccessfully.

The species has one peculiar locomotory pattern. An ind. landing on a wire always (and an ind. landing on a branch usually or always) flips its tail up immediately. Once. This is very reminiscent of robins.

The movement itself also recalls Purposes (but it is not accompanied by any real Bowing, any pronounced lowering of the head and neck) It also looks like simple balancing, but is probably something more. The ind. on the road did it several times, after a series of hops, just before a pause. I shall call the pattern Tailraising (as it may not be equivalent to the Tailflicking or Tailflipping of other species).

One ind. being chased by a conspecific repeatedly soared upwards on spread wings. This was spectacular. But it seemed to be an ant. mov. of going up to land on wires rather than a ritualized display. (Altho I suppose that it could also have been an indication or suggestion of "Rolling", if such a pattern exists in the species)

The Blackbills were very busy even when they were not attacking the Abyssinians. Usually flying from bush to bush or small tree to small tree. Inds. anything from 2 - 50 ft apart. Probably feeding in trees, but I couldn't see on what. One ind. paused briefly to make a fly-catching flight. Several inds. (also) came down to the ground, briefly. Again presumably to feed, but again the prey or seeds or fruits taken were unrecognizable.

The group of Blackbills moved roughly circularly over an area of approximately 1/4 m².

There were indications of pairs and trios within the larger Blackbill group.

At times, the Blackbills uttered lots of Single Whistles. All relatively long and plaintive. The "Peeeeeeeee" type. Obviously being used as "contact notes".

NOTE: there were no obvious signs of pairs or trios among the Abyssinians. And certainly nothing like "contact" patterns.

The Redbills were definitely integrated into the Blackbill group. Probably never in lead. Often toward rear. Sometimes in middle. I saw Redbills follow Blackbills repeatedly (at least 4 or 5 times). And I saw a Blackbill follow a Redbill at least once, in the middle of the group.

The Redbills seemed to be silent throughout

Most important, we saw no disputes between Blackbills and Redbills. The 2 species seem to be quite harmonious here now.

The Abyssinians never attacked the Blackbills. But I did see one Abyssinian attack one Redbill (perched a few feet from a Blackbill).

The Redbill seems to be low-man on this particular totem pole.

At one point, fairly early in the proceedings, a single Nympa, silent and alone, flew over the hornbills and rollers. No one seemed to pay any attention.

Later on, I found a Blackbill perched in small tree next to pond. Only 2-3 ft from a ♂ Pied Kingfisher. The latter was intent. Did lots of up-down Tail flips. One plunge into water. Blackbill flew on a few seconds later.

Obviously interspecific relations among the local Coraciiformes are both complex and various.

M Bowr
October 20
1976

Going to work in parc of ORSTOM station this morning. Lots of frog and some bird noises by 6:25 a.m., when it is just starting to get light. It looks as if it is going to be a clear day.

More bird noises by 6:30. Very peculiar and very loud. Doubtless babblers and all sorts of other things. It sounds as if several species, at least, were in breeding condition.

6:39. Hear Redbill "Whup" Notes. Far away. Perhaps 1/4 mile from where birds heard and seen yesterday (and earlier). Are the birds coming from a distant roost?

Several more series same notes in next few minutes.

Then one series rises to Double Notes.

Everything much quieter by 6:50 a.m.

7:10 See single Redbill on road in planted part of parc (near Chambres de Passage) Walks along. Silent. Apparently alone. Pecks at ground. Gets CCM type prey. Wipes it on ground. Then

flies up to tree. Out of sight.

A few minutes later and just a few yards down road. See single Sen. Perched 10 ft up in kade, over dense low scrub and high grass in "natural" area just at edge of planted section. Silent and apparently alone. Sitting in fluffed relaxed posture (see sketch). Then flies away. Utters several Rattles as it goes. Ordinary Rattles. Out of sight.

But then I hear several Intro-Rattle performances in neighborhood. The bird is apparently in other small trees (kades?).

COMMENT: the "mix" of species in this comparatively dense and diverse vegetation seems to be quite different from the mix of the more open and less variegated vegetation of the area visited yesterday afternoon. Doubtless there are few or no Coracias rollers here because there is not enough open ground. (Redbills seem to be one of the few Coraciiformes to use small patches.)

Walk on and then back. Sen seems to have gone. I.E. it probably has a large territory.

8:05. Down by office. See single Redbill 15-20 ft up in trees edge planted and seminatural areas. First in leafy leguminous tree (Acacia sp.?) then in adjacent kade. When first seen, it was uttering lots of "Whup" Notes in irregular series. These notes are individually much like typical "Whup"s. Except perhaps a little harder and shorter. In these circumstances, they seem to be functioning as "ALCN"s. Probably provoked by people walking and talking not far away. Then bird shuts up. Sits. Yawns. Sits. Preens. Utters some more "Whup" Notes. Flies away. (I.E. "Whups" may contain appreciable escape.)

NOTE: this bird presumably ♀ or juv. Base of bill quite yellowish (with dusky markings). No patches purplish bare skin.

8:45. Hear long series of Redbill notes not far away. Series is continuous. Notes seem to be real "Whup"s. Rising to Double Notes in end. Then silence. Then bird starts again as before. The bird must be quite high in one of the planted leafy Acacia-types.

Finally see the bird. Actually it is perched 40 ft up in top of Eucalyptus next to a leafy Acacia-type. Rather exposed on semi-dead branches. Silent now. Then it is displaced by single Heliosciurus gambianus. The squirrel does not seem to be attacking. It just wants to be where the hornbill is. Redbill flies away silently. Lands on another branch of same tree (all this is 35-40 ft up). Redbill sits. "Nibbles" Eucalyptus leaves! (Drinking????). Sits. Utters a few "Whup" type notes. Flies away. Disappears from view.

Perhaps there is only one Redbill ind. in this section of the park now?

Stopping observations 8:30 a.m.

As soon as I get back to house, I hear more "Whup" - Double Note performances in distance.

Then a whole series of "Whup"s nearer house. These become more and more accelerated until they are almost Rattle! Then slow again. Then bird shuts up.

A few minutes later, bird flies silently out of tree and over to Eucalyptus. Perches high and exposed. Quiet. Then flies on. 8:46 a.m.

COMMENT: This morning's observations (or auditions) suggest that hornbill vocal repertories may be (even) more like those of some rollers and kingfishers than I originally thought. The Redbill repertory seems to be a semi-continuum. All patterns may be variations on a single basic note — in this case "Whup".

Obviously a lot of information is conveyed by subtle inflections, slight changes in form. The visual and vocal repertories of Coraciiformes are rather similar in their reliance on subtlety and minor changes, even though their basic material is different.

Walk along the beach before lunch. We saw a Pied Kingfisher fishing (hovering) here a few months ago. There are none here at the moment.

In the afternoon, go out to place where so many hornbills and rollers were seen yesterday.

See a few and a Redbill (not together) along highway

Arrive site 4:03 p.m. Clear and windy. And there are still lots and lots of birds around. In first few seconds, see 5 Abyssinians, strung out along wires, 50–200 ft apart, plus a whole mass of Blackbills with at least 2 Redbills in low bushes and trees, possibly on ground as well, right near by. Rollers are silent. Some plaintive Single Whistles by Blackbills.

Hornbills fly away a few yards when I get out of car. Redbills and Blackbills definitely together.

There are also Long-tailed Glossy Starlings, 1 or 2 sp. of short-tailed starlings, and Pia-pias in the immediate neighborhood. In bushes, trees, and on ground. The Long-tailed Glossy Starlings, at least, seem to move along with hornbills.

One Blackbill swoops at Lapwing (the common species). Attack is silent. Lapwing flies away with usual alarm notes.

Then a Fulani comes and drags his herd of cattle thru area! The hornbills move off, apparently further into acacia forest. The Abyssinians remain on their wires. The Long-tailed Glossy Starlings, or at least some of them, also remain behind, on ground.

Now, 4:20 p.m, one Abyssinian is perched in bush only 2' above ground.

One of the Abyssinians on wire utters several single "Arnh" Notes before flying away. Probably disturbed by me.

Fulani has sat down to watch me. Cattle are still all over the place.

One Abyssinian in bush utters lots of single "Arnh" Notes. Apparently stimulates another bird, 200 yds away and across road, to utter single "Arnh"s and doublets and triplets. Same form(s) as yesterday. Then the latter shuts up. Flies down to exposed bank. Pecks into earth. Feeding? Digging a nest hole. Then flies up into bush again. Sits quietly.

2 other Abyssinians have sat on wires only a few inches apart for some minutes now (4:35). Could they be mates.

More Blackbill plaintive Single Whistles in distance

There does not seem to be any Pied Kingfisher by the pond today.
Can see hornbills flitting about in the low forest. One Blackbill chases short-tailed starling. Blackbill and Redbill sit on same branch, only 1-2 ft apart, without fighting. Abyssinian and short-tailed starling also sit close together without fighting. But an Abyssinian does swoop at a Redbill (like yesterday).

Some minutes later, hear Redbill "Whup" - Double Note perform once in distance.

Short-tailed starlings are still clustering around hornbills. Both Redbills and Blackbills. The group of starlings includes 6-8 inds. Very noisy. Parrot-like.

There are also Buffalo Weavers in neighborhood. But probably not as closely associated with the members of the hornbill-starling group as the latter are with one another.

See 4-5 Blackbills + 1 Abyssinian all close together on ground, gravel path with some grass. No fighting. Roller flies away silently. The Blackbills remain. Obviously feeding from ground. See several inds. pick up something, toss it in air, and swallow it.

NOTE: the Blackbills here now seem to be rather more frequently terrestrial than any I have seen before.

See another attack by Abyssinian on Redbill. Roller actually flies at perched hornbill, hovers in front of it. Redbill doesn't budge. Roller flies away, perches in tree 20 ft away.

There probably are at least 4-5 Redbills within group. 2 inds. sit close together for some time. Quiet. Preening. A pair?

There also are inds. of 2 species of Cinnator around. (One black above, one speckled black and white above.) Apparently ignored by the other birds.

The cattle have moved off now, 4:56. But the concentration of birds remains.

Then the hornbills move off. Probably via different direction. Can hear Blackbill plaintive Whistles in distance. Rollers, starlings, Piapiacs still around.

Then the starlings go. To roost by themselves?

One Abyssinian supplants another on wire. Silently.

NOTE: this species also seems to feed relatively infrequently. Every once in a while an ind. flies down to the ground. But I can't see what, if anything, is being taken.

One Abyssinian flies down near me. Then flies up with 3 "Arrh" Notes. Like Chatter of Sen?

NOTE: Re Blackbills. There are lots of insects, beetles etc., on this gravel path. Especially near cow-dung.

5:06. Most of the birds except the Abyssinians and a few hornbills (both species) seem to have moved still further away. Partially retreating before my gradual advance. The remaining Blackbills still utter plaintive Single Whistles quite frequently. I also hear one short burst of Redbill "Whup" or "Hup" Notes.

See Blackbills make 2 more, inhibited swoops at a lapwing. While not attacking a Redbill only 7-10 yds away.

Everything quiet 5;23. The Abyssinians are being very placid indeed. Absolutely silent now.

5;32. Bursts of single "Arrh" Notes by 2 of the Abyssinians sitting on wires far apart from one another and, as far as I can tell, from all other birds. One of the calling birds eventually flies up and away.

Single "Arrh" Notes must have a low releasing threshold.

NOTE: the common lapwing here is presumably Hoplopterus spinosus.

Leaving 5:40 pm.

COMMENT: Some aspects of interspecific relations here are clear. Others are still obscure.

Blackbills are very aggressive toward inds. of many other species. They may have a special dislike of Abyssinian Rollers. What is obvious, however — and rather interesting — is that they are not being hostile toward Redbills. Presumably, they are accepting Redbills as "other" members of their own species. And they are not, perhaps also surprisingly, fighting among themselves now.

Abyssinians certainly dislike Redbills, and they are not too hesitant to attack. They may also, of course, dislike Blackbills; but the latter may be too large and imposing to be attacked.

I think that Abyssinians and Sens must be excluding (avoiding) one another. They must be competing, and they may be the same effective size. Relations between rollers and marten-chasers must be tense everywhere.

M Bour,
October 21,
1976

Arrive same area as yesterday afternoon 6:40 a.m. Already quite light. Clear.

Some Abyssinian is giving long series single "Arrh" Notes. Bird invisible. Apparently in one of the trees of the forest edge. Shuts up 6:43.

Also hear Blackbill plaintive Single Whistles. Perhaps rising to Double Whistles in one or two cases.

Then brief burst Redbill "Whup" or "Hup" Notes.

Everyone is here!

5 Abyssinians on wires by 6:46. Several hundred feet apart from one another. Two inds (far apart — with other inds. in between) are uttering single "Arrh" Notes at intervals.

One ind. flies across road. Lands on wire near me. Utters series of "Arrh" Notes on landing. Then "swears" briefly. Sits silently.

More Blackbill Single Whistles and Single-Double performances. COMMENT: hornbills apparently continue to "sing" during the non-breeding season.

Then Blackbills fall silent. And Redbills begin. Repeated, apparently high intensity "Whup"-Double Note performances. No overlap Blackbill Sounds at first. Then there are Blackbill

plaintive Single Whistles. Complete overlap. But vocalizing birds are very far apart. Then Redbill(s) shut(s) up. Blackbills continue. Also Single-Doubles.

The sounds of both hornbills seem to overlap occasional "Arrrh" Notes by Abyssinians completely at random.

Hornbills are rather scattered on both sides of highway.

Population of Coraciiformes is dense here. Why?

One of the Abyssinians that is uttering "Arrrh" Notes most frequently has particularly long streamers. ♂? Are series of "Arrrh" Notes the "Song" of the species?

6:57. One of the Abyssinians swoops at small goshawk. With only a few "Arrrh" Notes (more or less chatter rhythm). Goshawk perches on wire. Roller perches on wire 8 ft away. Both sit silently. I.E. they are not too excited. Then goshawk flies off.

See perched single Blackbill "nibbling" small Acacia leaves. Drinking?

✓ Then see Abyssinian fly up to wire, presumably from ground, with small caterpillar in bill.

7:03-7:14. See group of 7 Redbills (no. definite) and ca 8-10 Blackbills all perched in single tree. A medium acacia without many leaves. Species mixed. Inds. 6-12 ft up. All inds. apparently silent. Little or nothing in the way of overt hostility at first. Although several of the Blackbills do "look down" from time to time.

Then all the Blackbills fly off. All more or less together. Going in same direction. But all the Redbills remain. I.E. the 2 species are partly segregated within the same mixed group, at least at times.

From the placing and relative sizes of the inds., I would suppose that these 7 Redbills comprise 3 ♂-♀ pairs and one loner.

The inds. are moderately active. Lots of "ritualized looking" patterns that might or might not be hostile. BW and picking at branches or leaves. Looking toward and away from one another. Some, possibly "accidental" supplants. All quite silent (at this distance).

Then are several bouts of "billing" or "fencing". Always, I

struck, between members of a same pair rather than between members of different pairs. Then the 2 birds of one pair – not birds that had been feeding previously – began Single-Double performances.

These performances seem to be quite conventional in form. Wingspreads quite extreme. When birds are Double Noting and Wingspreading they face toward one another (like Mal!) or stand side by side facing in same direction. One bird always starts performance before the other. Either sex can be the initiator. Perhaps the presumed ♂ initiates more frequently than the ♀, but I am not sure of this. The same birds must do at least 6-8 performances in fairly rapid succession.

None of the other Redbills in the same tree responds in any conspicuous or unmistakable fashion. No "communal display".

Performing birds eventually quiet down. Then the various pairs and the single ind. gradually drift off. In general direction taken by the Blackbills earlier.

Abyssinians continue to utter "Arrnk" Notes, rather irregularly. One ind. is perched 10 ft from another on wire. Utters several single "Arrnk"s. Then flies up. Swoops at other ind. Definite "attack". The aggressor utters 5-6 "Arrnk" notes in rapid series during swoop. Then flies off. Lands 20 ft away. Utters more "Arrnk" Notes. This time, some of the notes are organized into definite triplets and doublets — and — . Then falls silent.

A single Blackbill flies over rollers. They utter single "Arrnk" Notes, but the Blackbill doesn't pay any attention to them. Have the Blackbills lost their earlier hostility toward Abyssinians???

Everything much quieter by 7:30 a.m. Getting hot already.

The Rollers seem to have gone for the moment 7:43. I can still hear Blackbills and Redbills occasionally in distance.

Now see several Abyssinians in acacia scrub. Quiet. Preening.

Leaving myself 7:48.

As I go, I see small hawk (goshawk) chasing and swooping at Blackbill (which is larger than it is). Blackbill flies on, with little or no evasion. It may utter 1 or 2 "quavering" Whistles. 5 or 6 other

Blackbills fly after the hawk. All disappear from view.

M'Bour - Dakar
October 21-22
1976

Driving to and from Dakar, we see quite a lot of Abyssinians perched on wires in drier areas. This is the dominant roller of such areas and habitats.

NOTE: the Dorbatts say that they have seen many Ground Hornbills in Sénégal orientale. Usually in threes. One bird with red on face or throat; two birds without. ♂ + 2♀'s? Or ♂, ♀, and juvenile? Many cases, apparently not in flocks.

M'Bour - Ziguinchor
October 23
1976

Driving back to the Casamance today. Leaving M'Bour 8:00 a.m. Arriving Ziguinchor (at last) 7:00 p.m.

We saw lots of Senegals on wires between M'Bour and Fatick. Without a single Abyssinian (or any other roller).

Waiting for the Gambia Bac, we saw a group of at least 9 Blackbills flying between groves of tall trees, over rice fields (!). Uttering some plaintive single whistles.

In same area, we see pair (♀ and ♂) Pied Kingfishers feeding (hovering and diving) in (muddy) water edge Gambia River itself. Then, just as Bac pulls out of slip, 2:00 p.m., we see both birds perched on piling edge slip. Side by side, apparently silent. Then ♂ flies off and into obvious nest hole. In dried mud bank of slip. 1½ ft. above water level at the time (probably near high tide) and somewhat more (2 ft.?) below the top of the bank. It is obvious, therefore, that this pair is breeding. They probably (?) have young in nest.

Past the Gambia, ca. 4:00 p.m., first patch of Casamance-type forest (with Bay Colobus) we hear 2 Mals singing energetically. More or less conventional phrases. Perhaps this species is coming into breeding condition here.

Are the birds of the Casamance "behind" (in their annual cycle) their relatives in central and northern Senegambia???

Ziguinchor
October 25
1976

Starting work in Niaguis again. Arrive usual area 6:50 a.m. Fairly clear. No wind. Not much bird noise. (Note: there was heavy rain yesterday afternoon)

As soon as I arrive, I see a Lilac perched exposed 40 ft up tall tree. Silent. Apparently alone.

6:53. First Mal song. Short conventional phrases. Then longer phrases. Still conventional. No semi-Rattle components. Bird shuts up. Then hear more Mal songs of same type several hundred yards away. Then silence again.

More Mal songs 7:02. Now Intro - semi Rattle - Whistles. Phrase after phrase.

Go further along path. See what may be another Lilac perched exposed 30 ft up in distance. Also silent and alone. No! There seem to be 2 birds. Making rather high flycatching flights.

Everything very quiet 7:15 a.m.

Then a few more Mal phrases. Conventional.

7:36. A single Lilac flies rather low overhead. Silent. Note: the bird was flying with steady wingbeats. This is, I think, characteristic of the species. No glides like swallows or bee-eaters (?).

Then single Lilac perches 30 ft up in usual tree. Just sits silently. I do some sketching. As usual, the bird sits for a long time without making any hunting flights. Just looking regularly from side to side. Also occasionally upward. No flight int. moves.

Some conventional Mal phrases 7:52. Bird shuts up. Then, only a minute or so later, see single fem (definite) perched 65-70 ft up exposed dead twig top large f. mango tree. This must be quite close (30 ft?) to site from which Mal sang earlier. The fem is also singing. 4-5 phrases. Not too close together (perhaps a minute apart). In rather high diagonal posture. Head & bill includ upward with each song phrase. Posture and movement(s) quite reminiscent of Mal. Except that the

Sen is never at all fluffed underneath. All song phrases identical. Intro + long fast Rattle.

✓ Then bird shuts up. Flies a few feet. Catches dragonfly in air. Lands on adjacent perch. Wingspread on landing. Sits. Mandibulates prey in bill. Swallows it. Sits silently.

Then suddenly starts song phrases again. As before. At approximately same time, I see a Lilac hawking for insects above the same Fromager. Possibly the Sen songs are reactions to the appearance of the Lilac. But there are other possibilities and complications.

Suddenly a Bluebelly appears 20 ft up in Mango 300 ft from the Sen Fromager. Utters one Rattling Chatter-Slur. Disappears.

Then I see at least 2 Lilacs flying overhead. Hawking for insects. NOTE AND CORRECTION: these birds do glide like swallows from time to time. Technique seems to be absolutely swallow- or nightjar-like.

Then suddenly a Bluebelly flies up. Chases one of the Lilacs very energetically and rapidly. Utters several series of non-accelerated 3-5 note Chatters during chase. Then suddenly accelerates toward Lilac and then Soars up (and away) with set wings. The pattern looks ritualized. Then the bird glides downward, also (still?) with set wings. Utters "Aub" Notes at regular, rather long, intervals during downward glide. — — — — (Did I call this sort of vocalization "Slow-Chatter" on earlier occasions?) The Lilac in the meantime has succeeded in making its escape. All Lilacs apparently gone for the moment.

While this Bluebelly-Lilac encounter is in progress the Sen continues to sing. Phrases as before. But following one another more rapidly than earlier.

Then Sen shuts up. And I hear a few Mal songs not far away. Mal shuts up. And I see a single Bluebelly perched 50 ft up in the Fromager where Sen was earlier. (I do not know if the Bluebelly's approach "displaced" the Sen or not. I rather think that it may have.) Bluebelly is silent and (apparently) alone at the time

Then a Giant Kingfisher appears on scene!!! Flying high over head, perhaps 200 ft up, not far from Fromager. Uttering many loud single Yelps. Circles once. Then does semi-figure-of-eight. Then flies away, still Yelping. This bird is more or less alone. But I do catch brief glimpse of another Giant flying, at lower elevation, in far distance. Probably silent.

Is this flying high with Yelping the equivalent and partial equivalent of the aerial display of Mal? I think so

Everything relatively quiet by 8:03 am.

While I am writing these notes, I hear occasional bursts of Bluebelly Chatters and Rattling Chatters in neighborhood. Probably at least 2 Bluebellies around, but I can't see them well.

Then the Bluebellies shut up and/or move on

And then there are a few more Sen Songs ca 8:36 am.

COMMENTS: Relations among different species of Coraciiformes are certainly complicated here now. The following points may be made: ① Bluebellies certainly are aggressive toward, and dominant over, Lilacs. ② Lilacs probably tend to avoid areas occupied by Bluebellies whenever possible (and it may be possible quite frequently because Bluebellies range widely). ③ Bluebellies may also tend to suppress or inhibit activity and vocalization by Halcyon kingfishers. ④ Doubtless it is the Bluebellies that are largely responsible for the theatrical, scene shifting, "trap door" effect that is so characteristic of this particular area. Their comings and goings must determine the movements of many other species. ⑤ The Mals have been much less noisy and conspicuous today than they were a few weeks ago. (No aerial displays today!) And they also seem to be inhibiting or suppressing Sen(s) less. ⑥ There may be rigid song inhibition between Mal and Sen. With Mal "dominant" in this context?

? ⑦ It is possible that the Giant Kingfisher appeared to "monitor" the sudden outburst of Coraciiform, especially Bluebelly (?), sounds in the area.

⑧ I am beginning to think that all or almost all the local

Coraciiformes are members of a single, the same, social "group"

Getting cloudy 9:00 a.m. ~~I am leaving~~

Driving back to town, I see a Bluebelly perched 3 ft up in dead bush over mudflat edge mangrove swamp. Presumably prepared to beachcomb.

COMMENT: I suppose that the difference between the songs of Mal and Sen could be considered "character displacement". But there is, on the whole, surprisingly little in the way of either conspicuous displacement or conspicuous convergence among Senegalese coraciiformes. Why? Perhaps because their methods of territorial defense are not highly ritualized??

10:40 a.m. Back at hotel. Hear series 10-12 Sen Songs. Quite conventional. Each phrase consists of a single Intro followed by a long Rattle (note: the Rattles are gradually descending in pitch). Then see bird. It is perched at least 40 ft up (i.e. again very high) in nearly leafless tree. And in middle of colony of nesting storks, Ibis ibis!!! Nearest stork nest about 10 ft away. Kingfisher doesn't seem to pay any attention to its enormous neighbors.

Are some inds. of this species coming into breeding condition?

Ziguinchor
October 26
1976

Going to look for Pied Kingfishers across the Casamance River this morning. Bac arrives 6:45. Just getting light. Clear. Tide is high but going out (apparently covered the road in places a little while ago).

7:02 Single Pied flies by. Utters a few "Tset" Notes.

Then I hear several Bisyllabic Notes and some Twitter-Rattles in bushes ahead.

A few minutes later, another bird flies overhead. Apparently provoking a whole outburst of Twitter-Rattles

Note: this is approaching "group" area

I think that there are several birds in this area now. Hear some more Twitters. Then Bisyllabic Notes, Rattles, still more Twitters. Many Twitters of "Tsit-tsa-wreeeee" type.

Yes! At least 14 inds. here. Mostly perched yards apart from one another. Only Twitter during occasional approaches.

One ind. does 2 up-down Tailflips when landing, silently, on new perch, after being disturbed by me. No Shaking, F. Wingspread, or anything like that. I.E. "greeting" and most "landing" patterns are definitely social.

7:13 Aerial "display". Actually a chase. Involves 3 birds, with a 4th tagging along part of the time. Birds flying 50-100 ft up; irregular back and forth course. One or more inds. utter(s) vocalizations. All more or less similar. "Tseeet-tsit-tsa-wreeeeeee" type phrases. These might be described as Intro-Twitter-Rattle. One of the birds repeatedly accelerates and almost "catches" another. Then falls back temporarily. No glides or soars after attacks.

Then the birds separate. 2 of the inds. land a few seconds and a few feet apart in same mangrove bush. No Greeting or display of any sort — except that both have trace of "CR".

This is presumably very low intensity hostility?
One bird definitely ♀. The other is probably ♂ (but "his" second breast band is incomplete).

Things are relatively quiet by 7:30 a.m. The birds seem to have dispersed somewhat (there are lots of pedestrians on road).

Two inds. sitting quietly side by side, only a few inches apart, are definitely ♂ and ♀.

Both utter Twitters and/or Twitter-Rattles when a 3rd ind. flies by only a few feet away. ♀ also does brief half Wingspread. Then both relax & sit quietly. ♀ does brief Shaking. Both sit without further display. Crests relatively depressed. ♂ looks intent for fish from time to time.

There is another ♀ sitting apparently alone about 40 ft away. Several other birds, sexes unknown, in between. All intent. ♀ utters occasional 3-note Twitters. No Rattle component.

7:45 a.m. One ♀ lands. Definitely supplants or displaces another bird. Presumably mate, as there is no display by the other ind.

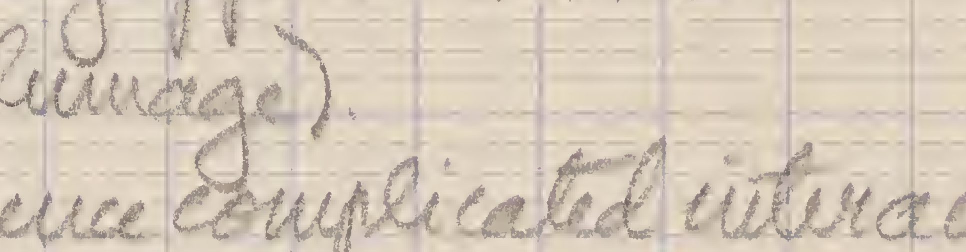
I think that there are 3 definite "pairs" in area now. Members of same pair sit 4"-10 ft apart. Different pairs usually 20-30 ft apart. All usually quiet. I.E. accustomed to one another.

Now there seem to be 4 "pairs". I am not sure that all the apparent "pairs" are composed of inds. of opposite sex. At least one, I think, is ♂-♂ (at least inds. in ♂ plumage).

Oh my lord! Long sequence complicated interactions 7:48-8:02. I look up to find 2 inds. perched in bush where definite ♂-♀ pair seen earlier. One is ♂ (I shall call this "First ♂") perched c. 7 ft up exposed, top bush. The other is ♀ perched 3 ft up, approximately 2 ft below and to one side of the First ♂.

Then another ♂, the "Second", flies in. Lands right beside the First ♂. The First ♂ may utter brief Twitter or Twitter-Rattle as Second lands. But certainly nothing very much as "Greeting". Second certainly vocalizes more. Probably Twitter and/or Twitter-Rattle at first. And immediately assumes very "Low-F" Posture. Head and neck stretched far forward, horizontally.

This is combined with extreme Wing spread. Wingspread is also horizontal; wings extended sideways.



Then the Second relaxes partly. Sits in more or less normal posture (but head is not held very high). And does nearly constant Wing- and Tail-shaking. Shaking gradually gets less.

The two birds sit side by side for over 5 mins. Always facing in opposite directions. → ① ← ②

The second ♂ resumes display from time to time. Low-F with bursts of Shaking. Note: F is usually straight forward. Only occasionally does Second turn slightly toward First when in F. Some of these F-Shake performances seem to be silent. Others are accompanied by vocalizations. All vocs seem to be unusually high pitched, thin, soft, "muffled". Some may be variants of Twitter. Others are certainly

variants of Rattle Thin high "Sreeeeeee" Notes or Phrases.

The first ♂ continues to be remarkably placid or stolid in outward appearance. Possibly deceptively so. Just sits. No CR. Occasionally just turns head to look toward the Second. This "looking toward" does not appear to be ritualized in form. But it is this pattern that seems to provoke most of the bouts of Low-F-Shaking by the second.

The Second occasionally looks downward between (more extreme) display bouts. This might or might not be ritualized. It might be hostile. Or a fishing int. mov.?

The ♀ continues sitting where she is during these ♂-♂ interactions. No vocalizations. She doesn't even appear to look toward the ♂'s. But she Does tend to do Wing- and Tail-shaking, without Low F or any sound, when the Second ♂ does his Shaking. She is obviously stimulated, in some way(s) - see below, by his performance

Then the First ♂ flies away. Second ♂ relaxes. Does several Shakes without F or voc. Then just sits.

♀ also just sits for a few seconds. Then she suddenly assumes extreme Low F. Without Wingspread. Silent. Then suddenly starts to utter long, thin, high, faint "Sreeeeeee" Notes. As far as I could tell, these sounds were identical with those made by the Second ♂ earlier

Immediately a ♂ flies in to join the ♀. I assume that this is the First ♂ returning. (In any case, I shall call him "First".) ♀ turns to him, still more or less in F. Probably still uttering "Sreeeeee" as he comes in. He may utter brief Twitter or Twitter-Rattle but not much.

First ♂ either lands directly on ♀'s back, or right beside her and then immediately jumps on to her back. Copulation. Lasts for a considerable number of seconds. ♀ just stands in huddled or semi-huddled posture, wings drooped but not (or not much) spread. ♂ stands on her back, grasping her nape with his bill. Is this characteristic of all Coraciiformes??? She raises her tail. He repeatedly lowers his. He also waves one or both wings from time to time. Obviously purely balancing. Both birds silent throughout. Cop. may well be successful

After cop. ♂ flies directly off back of ♀. Disappears (temporar-

(Left margin note:) ♀ F is with Wing- and Tail-shaking. Wing movements are not quite like ♀ of pakorines

ly? – see below). ♀ sits. No post-cop display. Then ♀ does a little not very vigorous preening. Obviously unritualized.

As far as I can tell, Second ♂ just looks on during the cop. Perhaps he does a little Shaking.

A minute or less after copulating ♂ flies away, a ♂ flies in (again). I think that this is (still or once more) the First ♂. Lands sl. eithy halfway between ♀ and second ♂. No Greeting by either. Presumed first ♂ just sits quietly, but with definite if slight CR. This situation is maintained for several minutes.

After this, my attention gets distracted (and also my memory fails me in retrospect). But some points are (again) clear.

First, the ♀ flies up and supplants Second ♂. With little or no display. Second ♂ flies off without resistance. ♀ sits quietly at the site that he vacated.

Then the other ♂, still presumably First ♂ flies off.

A few seconds later, a ♂, I think the First ♂ (once again), flies in and lands beside ♀. Definite Greeting. The 2 wds. sitting side by side, facing in same direction. Twitters and/or Twitter-Rattles. One, at least, of these wds. (♀?) stretches head and bill diagonally upward during vocalizations. Halcyon-like. One or both wds. probably also do(es) Shaking. Certainly no F, Low F, or Wingspread. Both birds sit quiet and relaxed.

Then a(nother) ♂ flies in. Lands on same bush. Perhaps 5 ft from "pair." Little or nothing in the way of Greeting or anything else in the way of obvious overt interaction. It is possible that this ♂ that has just flown in is the Second ♂ that has come back again. But for some reason (beyond recall now) I think that it is a third ♂.

Ca. 8:05 – 8:10 a.m., a fisherman appears in the neighborhood. Disturbs all the birds. Then he moves on. The birds come back. Then I hear lots more vocalizations, obviously complex interactions, while I am writing these notes, but I cannot follow the details.

As I am leaving, 8:55 a.m., I see another long aerial chase involving 3 birds. Probably much as before. Possibly with the same or similar vocalizations.

COMMENT: There are all sorts of things to be deduced or inferred from this morning's observations:

Some, at least, of the local birds are coming into full reproductive condition. Their behavior has changed in the last weeks.

Possibly the earlier behavior observed was also "reproductive" or "pre-reproductive" in some sense. Lots of (largely hostile) interaction in a sort of "communal display" or "lek" ground? Permitting the participating inds. to compare potential mates?

It is obvious that the ♀ of the "pair" observed this morning (perhaps my old "resident pair ♀♂?") is prepared to associate with, to tolerate or semi-tolerate, more than one ♂! At least 2. Probably 3. Perhaps as many as 4 or 5.

The various trios (and quartets) of inds. of this species, as of the Bluebellied Roller, can hardly be (only) nuclear family groups.

The duos of (presumed) ♂'s may consist of rivals rather than cooperators. The ♂'s may be "monitoring" or "escorting" one another. The "buddy system" may be far from friendly.

There seem to be parallels among other species. It seems to be characteristic of both Bluebellied Rollers and Pied Kingfishers that inds. that are close together, even associate for long periods of time, are often (more often) rivals than friends (mates). This greatly complicates the task of social analysis.

It would be nice to know if there is also a "superfluity" of ♂'s among Bluebellies.

(It occurs to me that some of the Mal-Sen interactions observed at Boukot Diola — escorting etc. — would look like some of the Bluebellied and Pied interactions if all the inds. were of the same species.)

The performance of the second ♂, on first arrival, beside the first ♂, may well have been "pseudosexual", "appeasement", behavior Macaque or baboon-like.

Have any of the Bluebelly performances been precisely similar? Have some of the reverse cops. been between inds. of the same sex?

If the interpretation suggested above, then certain consequences flow:

The Low F posture must be partly (largely) sexual (copulatory). The high, thin, faint "Sreeeeeee" notes may be similar (although doubtless also including an appreciable hostile component).

Shaking may well be appeasement. In partly sexual (and perhaps even non-sexual?) situations.

EXPLANATION: The Shaking performed by Pied Kingfishers is not quite the same thing as the Q of so many passerines. In Shaking, the wings are "shuffled" while they are more or less folded over the back. (There are also tail movements of course) But there could still be a phylogenetic relation between the 2 patterns. If so, Shaking presumably is more primitive, in form, than Q.

Has this relationship been suggested by anyone else before?
What are the Begging patterns of young Coraciiformes?
What are the Begging patterns of young Piciformes?

Ziguinchor,
October 27,
1976.

Going to look at some Pied Kingfishers this morning. Weather is clear at dawn. (But it poured rain yesterday afternoon and last night.) Bac arrive 6:40 am. Tide is high.

Hear first Pied Twitters some distance down road 6:54.

See inds. apparently flying into marsh from higher ground on mainland. One is silent. Another, some mins. later, utters Bisyllabic Notes – Twitter – Twitter-Rattle as it comes toward "group" area.

6:59. Approaching group area myself. Hear Mal Songs not far away! Definite. Conventional long phrases. Apparently overlapped at random by occasional Pied Twitters. (Pieds may not be particularly close to the Mal at the time.)

Mal shuts up after a couple of minutes. Pieds also quiet.

Reach group area 7:02. There are certainly birds around. Flying about. One ind. hovers repeatedly

Again I get impression that birds "check in" at dawn, and then go on about their most urgent business

Birds still around 7:05 are mostly perched quietly. Intent. Only occasional brief Twitter

♂ on "Resident" ("Res" bush). Utters a couple of semi-Bisyllabic Notes when another ♂ flies in, lands 4 ft away. Both sit intent. With some CR. Then one ♂ flies on.

Then silence. Obviously this period is being devoted to getting food.

7:10. One ind, sex unknown, lands close beside another, also sex unknown. High intensity Greeting Twitters and Rattles. Both inds. with heads and bills pointed upward (I shall call this "Diagonal" or "Diag"). The ind. with most extreme (highest) Diag also does Wing spread. Wings spread sideways and also slightly raised.

A few minutes later, a ♂ lands beside ♂ in Res bush. Newcomer adopts Low F, utters "High" Screeeee Notes (I shall call these "Trills"). Probably also Shakes (but I am not sure of this). Then flies off.

Now there 3 ♂'s within inches of one another in Res bush. There were brief Greeting Twitters when 3rd ♂ landed. One ♂ does semi-Low F at same time (apparently with Twitter, not Trill). Then all 3 sit. Some Shaking. One ind. preens. One flies off. The third flies off a few seconds later.

One back (?) 7:20. No Greeting. Newcomer sits silently, with CR

Again 3 ♂'s close together same bush. Probably some Greetings when they come together. One flies off. 2 remain. Silent. Both preen. This preening involves lots of (non-ritualized?) Shaking.

NOTE: I have seen quite a lot of up-down Tail flipping this morning. Both in social and apparently non-social contexts.

7:30 a.m. Now there are at least 7 inds, including at least 1 ♀, in area. All rather dispersed, 6-20 ft apart. All intent and/or preening. Silent. Then some moves with low-intensity vocalizations

Then quiet again.

Most of the birds are very silent most of the time. But there is little or no plunging. And no hovering for the time being.

7:34. See aerial performance. Probably end of chase. Birds 30-50 ft up. Uttering first Bisyllabic Notes (!), then Twitter-Rattles. One bird peels off. The other 2 fly over group area. All the perched birds of the group look or point upward. Utter similar phrases. Basically "Tseet" – 3 note Twitter.

All the voice of this species do seem to be modifications and elaborations of same pattern, of "basic note".

7:37. A few more Mel Songs in moderate distance. Overlapped at random by Pied sounds.

Getting hot 7:40.

Lots of Shaking when one bird lands beside another. One ind. silent. The other stretches neck forward and downward. Utters a few notes, perhaps muffled "Tseet"'s.

2 birds fly overhead, high. Provoke usual sounds by perched birds (these drown out whatever sounds are being uttered by flying birds). Then one of the flying inds. suddenly accelerates, almost catches the other, falls back. Then both inds. glide downward. Apparently uttering Bisyllabic Notes!

7:45. Aerial chase involving 4 inds. 2 pairs? Lots of Twitter-Rattles by flying birds. Then they separate, 2 by 2. Two of the inds. come to group area. ♂ + ♀. Probably Res pair. ♂ lands silently on Res bush. ♀ lands on bush a few yards away. Then flies to ♂. ♂ does Greeting. Head and neck stretched forward toward ♀ (not real or exaggerated Low F), with Wingspread (wings out and slightly raised), and utters several phrases. All phrases essentially "Tseet-tsuk-yuk". Either 3 note Twitter and/or "Tseet" – 2 note Twitter. Then both sit quietly. No more display. Not even Shaking. ♀ flies off. Back. Little or no Greeting. Again the 2 birds sit. ♀ preens.

They certainly don't appear to be very highly motivated sexually at the moment! Why the difference from yesterday?

♂ flies off; ♀ continues preening

There is a ♂ perched in another bush perhaps 12 ft from Res ♀. She suddenly flies to him. She is silent. He starts to Greet with Twitter and Wingspread. But she supplants him. Lands on his perch. At which point, he flies to "her" bush. Sits there quietly. Flies off a few minutes later. Presumably this was not the Res ♂, or at least not the "preferred" Res ♂.

8:02. A bird perched particularly close to me Alone. Intent. Does several Tailflips of usual sort. Tailflips seem to be flight int. movs. Are they (also) expressions of alarm?

Res ♀ back Res bush. A ♂ flies in; lands 3 ft away; some brief Twitter, probably mutual, as Greeting. Then both sit.

8:08. Everything quiet. I see that there are at least 2 ♀'s in group. Several perched inds. utter "Tseet-ta-ta-wreeeeee" sounds when another ind. flies by.

8:10. One ind. (♀?) flies into bush. At least 15 ft from nearest neighbor. Lands silently. Has large fish in bill. Probably longer than bill itself (head of prey is already in throat). Bird sits silently. No one makes any attempt to steal prey. After several minutes, the bird, still with prey flies down to my right. I think that there must be a nest in roadbank here. Quite impossible to see. Presumably only 1 ft or so above high tide mark (as road is not very high here).

There are a ♂ and ♀ sitting quietly in bush 30 ft from me. ♂ flies away. Lands in another bush 40 ft from ♀. Sits. Then the 2 birds "talk" back and forth. "Tseet-ta-ta-wreeeeee" phrases. I think that it is usually the ♂ who answers the ♀, rather than vice versa. The ♂ does several brief Wingspreads with his phrases.

Wingspreads may be partly friendly or sexual, not entirely hostile.

Inds. obviously recognize the voices of their "mates"?

See another aerial chase involving 4 birds, apparently 2 pairs. With Twitters and, probably, Twitter Rattles.

8:21. Complicated series of reactions. Sex at last. ♀ Res is sitting in usual bush. ♂ flies in. Lands beside her. He utters more or less conventional Twitter as he comes in. Stands beside ♀

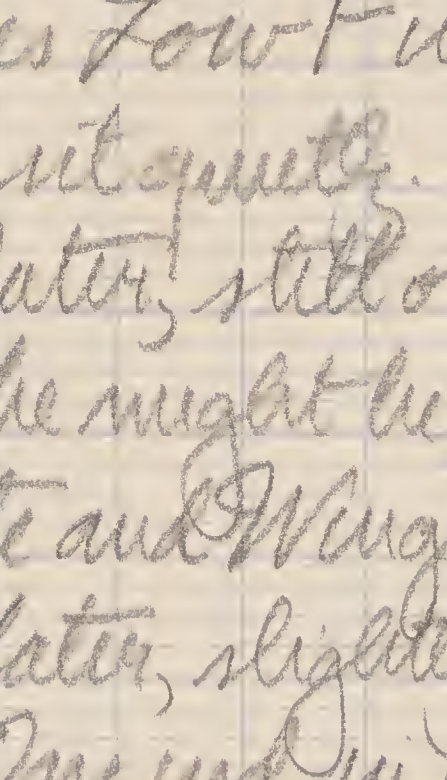
facing in same general direction as she is, but with his head and bill turned or twisted toward her. And he has rather weak horizontal wingspread at same time. The ♀ doesn't seem to react very strongly. She turns her head and bill toward him. Perhaps also Twitters (?). Nothing more. Then ♂ jumps onto ♀'s back. Sits there. Makes copulatory movements. Lowers tail several times. Waves wings for balance. Silent. (Note that there are no Trills during this particular incident.) ♀ doesn't resist actively. But she doesn't seem to cooperate either. Just sits. Not particularly hunched. Also silent. Then she flies off, while ♂ still on her back. Copulation almost certainly unsuccessful.

♀ flies to bush 10 ft away. Lands silently. ♂ who has slipped off as she takes off makes a little circle and then flies 20 ft further on, past ♀, lands in tree with 2 other ♂'s. Probably some Twitters or Twitter-type notes on landing. Then 3 birds. Sit. One flies on a few feet. Joined by one of the others (I don't know which one). And one of the two together assumes Low-F with Trills (definite) No Shaking. Then relaxes. All 3 ♂'s sit quietly.

Some minutes later, still on same perch, ♀ is approached by (flying) ♂. Looks as if he might be trying to land on her back. But she utters Twitter-Rattle and Wingspreads. And he flies on.

A few minutes later, slightly different area, see one bird perched beside another. One ind. in extreme Low-F, with Trills, and (sic!) horizontal Wingspread. No response. Flies on. I am almost certain that both inds. involved in this incident are ♂. More pseudo sexual behavior!?!

A few more minutes later. Res ♀ is back in usual bush. A ♂ lands beside her. Twitters as Greeting. Then ♀ assumes distinctive HD or BD with extreme CR. SEE ALSO COMMENTS BELOW.
♂ flies on after a second



Things relatively quiet again 8:53 am

It seems quite probable that the Res ♀ has a "court" of 3 ♂'s. (I don't know about the "other" ♀ here. She is presumably the one with young in the nest. Her sexual relations are presumably different.)

One Pied watches a dragonfly go by, but makes no attempt to catch it. Presumably this kingfisher is not built for agile and rapid turns and maneuvers in the air.

9:00 am. 2 ♂'s sitting close together, apparently peacefully, in Res bush. ♀ sitting quietly in same bush 4-6 ft away.

There also are 3 ♂'s together in another bush 20 ft away. Moving about a little, with occasional Twitters, but certainly not fighting vigorously. (Note: this is same bush where 3 ♂'s and Low-F performance earlier. One might assume that the 3 ♂'s here now are the same inds. seen earlier. But, if so, who are the 2 ♂'s with the Res ♀ now??? Does she have a court of 5 males? Or is there at least social promiscuity?)

9:04. Look up to see ♂ hovering in flight over back of Res ♀. He is uttering Trills. Trill after Trill. She is either silent or uttering Twitters. She flies off. He flies on in opposite direction. She lands silently on perch 12 ft away. Does repeated extreme up-down Tailflips. Relaxes.

Some of the sexual approaches seen today are remarkably abrupt. Some or all of them may well have been "rape" attempts.

Oho! 9:07. Res ♀ back at usual perch. Another bird, almost certainly ♂, lands 4 ft away. In more or less Low-F posture. He seems to have something in bill. He flies to ♀. Lots of Twitter and/or Twitter-Rattle by both birds. ♀ (also) BD with extreme CR. Then ♂ flies on. And I see the ♀ apparently swallowing fish!!! This would seem to have been a case of a ♂ feeding a ♀. Interesting that it was not followed by a copulation attempt.

9:15 a.m. It is unspeakably hot now. I am starting down road. Nothing of interest on way to Bac.

NOTE: Pied Kingfishers are always looking downward. Much of this must be a prelude to fishing. It is difficult to believe that they can have a "simple" HD display like the Bluebellies. But they would appear to have a related and perhaps partly equivalent pattern: the

"BD" ("Billdown"). Possibly the only ritualized version is the form sketched on p. 211. Bill down while neck is stretched upward, combined with CR.

COMMENTS: Obviously sex and hostility are closely associated. And obviously the connections between them are complex and "peculiar" in this species. But I am still not certain of the precise nature of the connections.

The sexual receptivity of ♀ Pied Kingfishers may well be positively correlated with, even dependent upon, hostility, either the sight or sound of agonistic patterns by neighbors or mates and/or actual participation in disputes.

♂ Pied Kingfishers obviously go "pseudosexual" from time to time. Presumably as appeasement (of rivals). See Desmond and Stick-le backs. But does this behavior also affect (stimulate or reassure) the ♀?

I have yet to see a reverse copulation in this species, despite the apparently pseudosexual "soliciting" appeasement. Is this significantly correlated with the sexual dimorphism in plumage pattern?

Is dimorphism also related to crowding in groups in relatively restricted spaces??? If so, why?

Obviously the cops. of inds. of this species cannot be as "mobile" as those of hornbills (or Mals?) simply because of the crowding.

NOTE: The Mal may be much more of a pêcheur than the Sen. Halcyon would appear to be the most adaptable genus of kingfishers.

ADDITION: I saw a bright blue roller-like bird, with long tail streamers, perched high (100 ft) in tall tree in town (near M. Stancato's) this morning. Presumably an Abyssinian. The first we have seen in the Casamance.

Ziguinchor
October 28
1946

Going to work same area again today. Weather is clear. Bac arrives 6:33 a.m. Water is very high, even higher than

yesterday. It is just getting light
Two Pied Kingfishers fly by 6:43. One uttering Bisyllabic Notes and Bisyllabic-Rattle phrases
Arrive group area 6:55. Birds around. Some usual vocs.
Peculiar incidents. Single ♂ sitting top Res bush. Fish in bill. Just sits. Looking around rather tensely or nervously. No CR. Silent. Pays no attention when another ♂, without fish, lands in bush 3 ft away. Second ♂ also silent. Then first ♂ flies down to join second. Mutual Greeting. Twitters. Each ind faces the other. Sort of ordinary, little ritualized, not Low, F postures. I do not think that fish is transferred in the process. Then 2 birds sit silent by side by side. No CR. One with fish (still) in bill. Then one ind, probably the second, flies away, disappears. Remaining ♂ just sits in unritualized posture.
He does silent CR (definite) when another ind. flies by. Then relaxes.
Then flies over to another bush 20 ft away. Lands beside another ♂, Who also has (larger) fish in bill!!! No Greeting. The 2 ♂'s sit side by side. Then first ♂ flies away. Back past Res bush, to stump 10 ft further on. The ♂ left behind "manipulates" fish. Readjusting in bill. Fish obviously difficult. Then this ♂ swallows fish.
When I look back see single ♂ and a ♀, 3 ft apart, in Res bush. Neither has fish. A second ♂ lands 3 ft away from both the others in same bush. No fish. No Greeting by anyone
When I look up again, a few minutes later still, there is only a single bird in Res bush. a ♂, With fish in bill. Sits. Flies away.
COMMENT: All this is difficult to interpret. I think that there was no feeding of one bird by another. Nor any feeding of young in nest. (Although the perch where 2 ♂'s sat side by side, each with fish in bill, is not far from where a nest may be.) All the fish-carrying
✓ may well have been part of the normal, individual, feeding process.
✓ The fish carried seemed to be approximately 2.5 - 5.0 cm in length
✓

This may be larger than usual. Viz the fact that most other prey apparently taken on other days and during other periods of observation seems to have been swallowed immediately. Perhaps the birds have been taking unusually large prey here, now, because the tide is so high???

Everything fairly calm 7:23. One ♂ and one ♀ sitting 4 ft apart Res birds. Another ♂ lands beside ♀, definitely tries to jump onto her back. Some vocs. Including Trills. By ♀, I think. Mord., "Ungh", F. ♂ flies off.

A few minutes later, a ♂, another or the same ind., lands beside same ♀. Mutual Greeting. Twitter and/or Twitter-Rattles. In Diag or semi-Diag. No attempt to mount. Both birds relax. Sit silently side by side. Then ♂ flies off.

The ♀ does not seem to be "receptive" at the moment!

7:30 am. There are 6+ birds in the neighborhood now. Including at least 3 ♀'s. Definite ♀ 20-25 ft apart from one another. Two near ♂(s). One by herself. Most inds. sitting silent most of the time.

Isolated ♀ suddenly flies off. Flies over most of group's area. Utter ing usual Twitter-Rattles. At least 3 other inds. fly up after her in brief pursuit. Also utter Twitters and/or Twitter-Rattles. Pursuers include at least 1 ♂ and 1 ♀. So pursuit is probably territorial def ense rather than sexual. Pursuing ♂ and ♀ return. Land together. Only brief and low intensity Greeting.

Everything quiet 7:40. Tide still very high. Beginning to get hot.

ADDITION: a few minutes ago, I heard some conventional Mal Song not far away!

All the perched birds utter "Tseet-taa-tr-srrrrrrrr" type vocs when a single Pied flies silently 20 ft overhead.

NOTE: these are the phrases that I tend to call Twitter-Rattles. The term may be O.K. But the phrases could be equally well called "Tseet"-Twitter-Rattles. Each phrase may be strictly homologous with a Song of *Halcyon* spp. But they are not being used by these Pieds as conventional Song.

In fact, I have yet to see, or at least recognize, any pattern or complex of patterns that functions as conventional Song in the Pied. Has Song become unnecessary, as such, because the birds tend to be gregarious???

If so, what happens to, or is done by, the apparently isolated indivs. and pairs that one sees elsewhere???

Spend some time sketching

8:03 Another aerial chase. Again apparently hostile and involving 4 birds, presumably 2 pairs.

COMMENT: It would seem that this group is composed of pairs. With or without accessory or supernumerary ♂'s. Even though the basic social structure is often obscured, complicated by other birds, and difficult to decipher. The whole set-up may well be quite similar to the groups of Bluebellied Rollers. Only more compressed in space.

8:06. See aerial chase involving 5 birds. Certainly including both ♂(s) and ♀(s). Probably 2 pairs, plus an extra (either a supernumerary ♂ or a member of a 3rd pair).

Good heavens! Now there are 3 ♂'s perched in Res bush. 2 side by side; the third perched 2 ft away. All calm and quiet. The more isolated ♂ flies away, disappears. No sound or response by the other 2 ♂'s. One or both occasionally calls (low-intensity) when some neighbor moves. Again sit quietly and calmly. Then one ♂, without preliminaries as far as I can tell, suddenly jumps on the other ♂'s back!!! No cop. movements. Top ♂ slips off or dismounts after 1-2 secs. Then the 2 birds do mutual "Greeting", still side by side, more or less facing one another. Greeting display consists of low-intensity Twitter (apparently without either distinct "Tseet" or Rattle components). Brief. Both birds relax. Continue to sit side by side.

This would appear to be a rather well adjusted homosexual pair!

Then suddenly the (or a) ♀ flies in. Supplants the 2 ♂'s with little or no display. Sits in their place (which is also, in all probability, her usual place).

A few minutes later she is joined by a ♂. Again little or no display. Then he flies off. She sits quietly. ♂ back (?). Lands same bush 4 ft away from ♀. No Greeting. Both sit. Then ♂ flies over, lands beside ♀. They turn toward one another. Some voc. I think only a few "Tseet" and Bisyllabic Notes by ♂. Then ♂ jumps on ♀'s back. She immediately utters Trills, perhaps in semi-Diag, and Wing-spreads. ♂ flies away, disappears, without attempting cop. movements. ♀ also flies away after some seconds.

8:32. ♂ lands in Res bush. Fish in bill. Utters several "Trit tsit tsa-wrrrrrrr" phrases in semi-F, still with fish in bill. Then flies off. Possibly to presumed nest hole.

Then ♀ and 2 ♂'s land in Res bush almost simultaneously. About 2 ft apart. ♀ ♂ ♂ No vocs. One ♂ has CR. Then he relaxes, crest lowered. All 3 inds. sit placidly. Then ♀ flies to join one of the ♂'s (the one that had CR earlier — i.e. the "dominant" or "preferred" ♂???). No Greeting. Then the ♀ and this ♂ fly away. The other ♂ remains, sitting quietly.

Tide is going down now.

♀ back Res bush 8:50. Lands 3 ft from ♂ who has been sitting there. No Greeting. ♀ preens. Also looks downward several times. And ♂ flies away. Coincidence? ♀ continues to preen. ♂ comes in. Lands beside ♀. Mutual Greeting. Twitter-Rattles. In semi-F - semi-Diag postures. ♂ flies away to perch 2 ft away. Both inds. sit quietly. Then ♀ flies away silently. Back. Lands beside ♂. Both give "Trit-tsa-wraaaaa" Greetings. Then sit side by side. Both do many Tailflips. Then ♂ looks down. Then both relax. Then ♀ flies away again.

This may be ♀ and her "preferred" ♂. But relations between them do not seem to be entirely easy.

I start down road 9:00 a.m. There is a fisherman approaching. The birds are disturbed.

A few yards down road, see ♂ with fish in bill. Silent. There are a ♂ and a ♀ 10 ft away from him. ♀ also seems to have some-

thing in bill. But this looks like mud. Has she been excavating?

Pair flies away. Single ♂ remains. Still with fish in bill. Quite silent. Crest down. Then ♂ and ♀ of "pair" back. One lands on each side of ♂ with fish. Only inches away. Both ♂ and ♀ of pair utter "Tsit-ta-wraaaa" phrases as Greeting. First note of each phrase particularly hard, loud, emphasized. Then all 3 birds sit. ♂ and ♀ of pair do occasional Tail flips. ♀ also has trace CR from time to time. ♂ of pair has crest definitely smoothed down. But every once in a while he leans forward, in semi-F-semi-Diag, toward ♂ with fish, and utters brief bursts of loud hard "Tsuck" notes (quite like intro "Tsit"s of earlier phrases). Obviously hostile. But nothing develops. All 3 birds sit. Central ♂ still with fish. Making no effort either to swallow it or to pass it on.

Then all 3 birds suddenly fly off. Alarmed by fisherman. The ♂ with fish still carrying it as he goes. Birds fly behind bushes. I cannot see them well. But one bird utters series of rapid, urgent, "Tseeee tseeee tseeee tseeee tseeee...." notes.

NOTE: I think that I have heard both the "Tsit"-Tsuck type and "Tseeee tseeee tseeee...." type sounds before. Perhaps they should be recognized as separate categories. The first type seems to be hostile. Probably strongly so. The second type may be a sort of PN.

COMMENT: The apparent superfluity of ♂'s here now probably cannot be explained by supposing that some (or "their") ♀'s are incubating. Or it cannot be explained by this factor alone. There seemed to be a superfluity of ♂'s even during my earlier observations, weeks ago.

The Pies ♀ may have several different degrees of preference (or non-preference) for her associated ♂'s. A sort of sexual rank order. The situation is reminiscent of the 2-3-4 arrangement of the Bluebellied Rollers at La Paillotte. (Although the roller case may have involved 1 ♂ and several ♀'s).

Arrive at Bac 9:30 a.m. without seeing anything more of interest.

Go to Ossouye at mid-day. 1:30 p.m. Marsh just before Ossouye

Sunny and hot. See 2 (possibly 3) Bee-eaters. M. persicus. Perched wires. Flycatching 6-15 ft up over water by rice and mangrove. Inds. not close together. Silent. Lots of Gaping; but I think only because of heat. These must, I think, be new arrivals in area.

A few hundred yards further on, see single Abyssinian on same wires. Silent and alone. Long tail streamers.

Presumably there has been a big migration in the last few days. Timed, more or less, to coincide with beginning of dry season.

2:35 p.m. Ossouye itself. Single Blackbill flies from large tree to large tree in village. Silent.

Going back, ca. 4:00 - 6:00 p.m., we see several things:

A single Abyssinian nr. Ossouye. Presumably same ind. seen earlier. Still alone.

At bridge, between Ossouye and the Bac, where we have seen a "group" of Pied Kingfishers before, we see 6 inds. of the species. On edges of bridge itself and on wires. Definitely 3 ♂'s and 3 ♀'s.

Past the Bac, we see a Yellowbill on ground. It has something in bill. Food or a pebble. It flies up to join mate in adjacent tree.

Much later, in the nursery at Djibelor, we hear one or more Yellowbills uttering long series Monosyllabic Whistles. Sounded quite high intensity (Still) breeding???

Pied milesed to here

Ziguinchor,
October 29,
1976

Going to Nyassia this morning. Arrive 6:40 a.m. Cloudy. No wind. Just getting light. Quite a lot of DC. Mostly bulbuls, I think.

See something hawking for insects high in air. Either a Kilac or a bat.

6:55 a.m. Hear long series of Yelps and at least one Rattle near highway. Sounds like Giant Kingfishers. Yes! See 2 Giants

flying away to East. Rather high (50-100 ft above tree tops). One of them utters more Yelps. NOTE: this is direction in which the Giants always seem to move in early morning. They may have separate feeding and roosting areas.

6:57. One conventional Mal Song phrase.

7:02. Two Yellowbills pass by. Flying in stages from tall tree to tall tree. One of them utters series of Single Whistles.

Note: there are a lot of dragonflies over and around pond. Nothing chasing them at the moment.

Another Lilac flies by, hawking for insects. Silent and alone. Relatively low. Perhaps 40-50 ft above ground. It occurs to me that the Lilac may be partly "crepuscular." Feeding much more actively very early in the morning than later in the day.)

NOTE: Perhaps I should distinguish between "flycatching" and hawking for insects. The former entails short flights. The latter long flights. Both bee-eaters and Eurystomus do both. But Eurystomus, at least the Lilac, may be more of a hawker - while Cinn is more of a fly catcher. Difference must be correlated with differences in prey.)

7:15. A Blackbill appears. Flying. Utters Single Whistles in flight. Lands 40 ft up in dead tree. Now I see that there is a single Bluebelly perched 30 ft up in same tree, probably 20 ft from Blackbill. No reaction between the 2 species. Blackbill sits, BW's. Then does Single-Double performance. Then flies on. Apparently "alone" throughout.

Yellowbill and Blackbill ranges must be at least partly overlapping here.

NOTE: the Yelps of Giant Kingfishers do not sound unlike the Single Whistles or Monosyllabic Notes of Yellowbills.

7:24. Bluebelly is still sitting in dead tree. Apparently hasn't moved. Sitting hunched up.

Hear more Blackbill and/or Yellowbill sounds in far distance.

NOTE: there is a Stilt stalking thru pond in center. I.E. this pond is not very deep.

7:28. More Mal Songs. With multiple Intro Notes. Phrases otherwise conventional. Moderately long.

7:31. Sun starting to come out.

Now there are several Mals singing. Overlapping phrases. Inds at least several hundreds of yards apart. Some phrases now Intro → semi-Rattle → Whistles "Tuk tuh-tuh-tuh wheeoo wheeoo wheeoo whuh whuh". I.E. semi-Rattle component is always Triplet. Singer eventually shuts up.

7:40 Hear single, long, Bluebelly type Rattling Chatter in neighborhood. Can't see bird.

Then more Mal songs. Again semi-Rattle component. As before. Then several inds. singing. Again far apart. Some very short phrases. Some conventional long phrases without semi-Rattles. The Mals are certainly in voice here today. And Fems are silent. Very contrast with my last visit here!

Everything quiet 7:50.

More brief conventional Mal songs 8:07. Then silence again. Then another Bluebelly Rattling Chatter nearby. More Mal songs.

Bluebelly flies by. Apparently alone. Lands, silently, in Mango some distance away.

Mal songs loud and frequent now. Long conventional phrases.

Walk down road to see Bluebelly. It is perched quietly, exposed branch, 25-30 ft up. Looking around. Has very short tail streamers. Area is perhaps blackish underneath. Young?

8:17. 6 Purpurs fly into tall tree several thousand meters away. Some Chatter in flight. Bluebelly doesn't respond.

Mals still singing. But still no display flights.

See 2 Lilacs (definite) wheeling in wide irregular circles hawking for insects. 8:25. Very high up. At least 200 ft. Probably more. So the species can be sustainedly active! Lots of glides as well as periods of flapping flight. Then 2 Lilacs, presumably same 2 inds, land in usual tree 8:30 ½ ft apart from one another (and perhaps 750 yds away and out of sight of the Bluebelly). Sit silently. Then one ind. makes flycatching flight down near surface of water. Back. Both inds. continue to sit stolidly.

Now there 1 Cain (typical) flycatching in usual bushes

8:42. Hear several Rattling chatters from direction of Bluebelly.

Then one not very loud twangy "Arrrh" Note from tree in which the Lilacs are perched. Note: one of the Lilacs has semi dark belly patches of gray lower breast. Juvenile?

The brighter of the 2 Lilacs disappears. Duller, possibly young ind. remains. Then it is swooped at, supplanted, by small ♀ sunbird (species unknown of course). Flies off without resistance. Or sound.

Mals still singing fairly frequently 8:50 Both conventional and (a few) telescoped phrases. All birds certainly in trees.

See Mal perched 60 ft up, exposed, top tall tree. It probably utters several conventional song phrases. Then silent. While another bird, invisible but probably not very far away, sings conventional phrase after twice. The (now) non-singing bird in view twice does Wingspread! Not very extreme. Apparently silent. Then flies away. Away from singer. Possibly resumes singing itself from some more distant tree. This may well have been a territorial boundary dispute.

NOTE: Cordon-bleus are carrying n.m.

Why are there no aerial displays by Mals? Have they "settled down". Are ♀'s already chosen? Already incubating? Are territorial arrangements semi-fixed? Easily maintained with only occasional and not very high intensity encounters? I think probably the latter.

9:15. Walk back toward highway, then take small side path. This takes me to area of thick mixed vegetation. Nursery (rice), thick scrub; with clumps of large trees, mostly mangoes. Actually, this is only a few hundred yards from area in which I usually work. But sort of around and behind.

Hear Mal sounds. Obviously by ind(s) I have been hearing all morning. Performing bird(s) 20-30 ft up, inside mango 100 ft away. Performance begins with "Wheee whuh" Notes. These sound like Whistles of a brief song phrase without Intro Notes. Then these are followed by more conventional phrases. Usually Intro → 3 or 4 Whistles. (Note: first Whistles are higher pitched than Intro.) Then it sounds as if 2 inds. are uttering similar phrases, still Intro → 3 or 4 Whistles,

close together. Phrases broadly overlapping but slightly out of phase. A peculiar sounding duet. Then one ind. continues alone. Finally shuts up. During all this vocalization, I caught only one glimpse of one ind., definitely Mal, moving from one perch to another.

Does the species really have "Pure Whistle Songs", a few Whistles without Intros, as part of its "normal" repertory?

If so, were the puzzling "Wheeeuh wheuh" type sounds heard at Boukot Diola a form of Pure Whistle Song???

This could be the type of pattern used by ♀'s to answer their ♂'s (???).

While these Mals are vocalizing, another Mal lands 20 ft up in dead tree (Fromager) just above me. Thus only 100 ft away from singing bird(s). Lands silently. Does one Wingspread. It is a normal Mal with normally bright plumage. Sits. Then another Mal flies in. Lands 10 ft away from, and slightly lower than, first ind. Also silent. Also does one Wingspread. Back more or less toward partner. Sits. This ind. has relatively dull plumage, little blue on breast. And only tip of upper mandible is red (rest is dusky). Presumably definitely juvenile. Possibly also Dull of Dull-Bright pair seen first day here? First ind. flies off. Dull bird sits, watching me, obviously nervous. Does many single up-down Headbobbing movements. Then flies away.

While I am writing this, there are several more outbursts of (this time) quite conventional Song from different parts of the neighborhood. Presumably by owners of different territories. Phrases of differ inds. apparently overlapping at random.

One ind. who has been singing suddenly flees by me and into adjacent mango. Catch glimpses of fast movement in tree. Chase??? Apparently accompanied by many thin high "Freeeeeee" Notes. Trills?

A few minutes later, 9:50, hear more [trill] Songs from another Mal, obviously perched in another nearby Mango. These are reminiscent of aerial Songs. Progressing from Intro alone phrases to Intro → many Whistle phrases quite regularly and smoothly.

This bird is answered by a more distant ind with conventional

al phrases.

Then both birds shut up

Mals are thick on the ground here. And some inds (more probably pairs) have comparatively small territories. Perhaps only a few hundred yards across.

9:57 Hear single Bluebelly Rattling Chatter in neighborhood. At a time when adjacent Mals are silent. Coincidence? I doubt it.

NOTE: this area is very, very close to where a fem was seen and heard singing on my last visit. But I have not found a trace of a fem today. Has it been driven out? If so, by whom?

Things generally quiet by 10:05 am. Only a few Mals singing in distance. Leaving myself.

On the way back to town, I see another Bluebelly perched 2½ ft up in dead bush over mudflat edge mangrove swamp.

ADDITION: We passed AA Yellowbill area late yesterday afternoon. Looked at the hole with the birds seemed to be interested in a few weeks ago. It seems to be unchanged in form. But there was a squirrel (presumably Heliosciurus gambianus) peeking out of it!

The Yellowbills may have abandoned the hole because the squirrel(s) took it over. Squirrels could be important competitors of hornbills.

4:45 pm. Back to side path Magnus area. Everything quiet.

Single adult Mal flies into dead tree. Looks away. Then flies to Mango. Lands apparently alone, with silent Wingspread.

Go along main path. Not a thing.

Then further along highway to Kolda 5:15. Reach area, edge large expanse of marsh and ricefield, where group of Pied seen weeks ago. There are 4 Pieds here now. 3 ♂'s and 1 ♀. Not close together. Strung out on wires and on stumps. One ♂ has fish in bill. Just sits. Another ♂ flies to him, starts to land. ♂ with fish utters brief Twitter and Wingspreads. Approaching ♂ flies off!

Then ♂ with fish and another ♂ fly away, uttering 3-note Twitters as they go.

Back fairly soon. Fish apparently gone

Then a fifth bird shows up briefly. Sex unknown.

We turn back 5:39 p.m. A few hundred yards down road. See a single Abyssinian and a single Black winged Kite perched 4-6 ft up, 5 ft apart, in same tree middle of rice fields. No visible interaction between the 2 species. (These kites really are ignored by Coraciiformes! In spite of being competitors!) Then Abyssinian flies to highway. Lands. Slow exaggerated Tailraise. Then stands, still with tail partly raised. Flies to wire. Another Tailraise of the usual type for the species. Then sits normally. Eventually flies off. Lost to view.

Ziguinchor
October 30
1946

Working at Magnus again. Arrive 6:31 a.m. Clear.

Hear Mal Songs, probably by several inds., immediately. Not very close. All moderately long conventional phrases, I think.

Then songs stop 6:36. (This may be characteristic. There may be a usual pause between first "dawn Song" and the beginning of the first flush of intensive morning singing.)

But not much of a pause! More Mal Song, this time nearby, at 6:40. All phrases conventional and rather long.

Then another pause.

I go down side path. This pause lasts quite a long time.

7:02 See single Blackbill fly by. Silent and alone.

First Mal Song after pause 7:04 a.m. Progressive type. Intro – Intro – Intro + 1 Whistle – Intro + 1 Whistle – Intro + 2 Whistles – Intro + 3 Whistles .... Etc. Singing bird obviously perched rather low in tree. Shuts up after a few seconds.

Then more Mal Songs further away. Multiple Intros and/or semi-Rattle components. The latter are really (as usual?) Triplets.

Now, 7:12, there are several Mals singing simultaneously almost certainly on different territories

7:14. Single Mal in dead tree (with one vine). Perched 20 ft up. Sits. Silent and alone. Flies away.

Then another(?) Mal begins to sing perched exposed 25 ft up in tree 150 ft away. Song is Progressive. Head and bill pointed diagonally upward. Bird reaches 4-5 Whistle stage. Breaks off. Flies away.

NOTE: All Mals cited are in full adult plumage unless specifically stated otherwise.

7:21. Catch glimpse chase involving 2 birds, 20 ft up in tree. They may be Mals. Chase accompanied by one squawk or Rasp.

What do Mals feed on here?

More Mal Songs in distance. Then silence again. So I walk down main path. Again more conventional Mal songs in distance.

7:43. A couple of Yellowbills fly high overhead. With a few single Whistles. ♂ first. ♀ 20 yds behind.

NOTE: I have not seen any Pygmy Kingfishers for days and days. Could they have migrated away from this Region???

See single Yellowbill perched in tree far away. Silent and alone. Preening. Perhaps 30 ft up.

7:54. Single Bluebill lands, with Rattling Chatter, on top of dead broken R palm behind farm. Peers down into hole. Flies off into distant tree where Yellowbill is still perched. Lands at least 25 ft away from Yellowbill. Sits. No obvious reaction between the 2 species.

This presumably is same Bluebill seen yesterday. It seems to be quite alone. Mate incubating?

7:59. There have been no Mal Songs at all for a considerable time now. Very different from yesterday. Why? (Note: it is clear and sunny but colder today than yesterday. There was rain last night; but now it looks as if dry season were really beginning.)

Back to side path 8:03. Here I do hear one conventional Mal Song phrase

Another Progressive Song performance 8:14. Bird obviously perched in tree. Doesn't continue very long.

More Songs by other birds a few minutes later

Back to main path. See single Bluebelly 30 ft high in Mango. It is definitely blue underneath. Sits and preens.

Farther on, see single Lilac perched in small tree. Apparently alone. Does some preening. Also utters single "Aruh" Notes from time to time. Definite. Notes are very buzzy or twangy but not very loud. More like Abyss in am than anything else. Bird flies off. Possibly disturbed by clumsy movements of a Cribifer not far away. (Addition: this Lilac may have uttered one soft Rattling Chatter or Rattle at one point; but I am not certain of it.)

A pair of Yellowbills, definitely ♂ and ♀, passes by from tree to tree. Trace of "Song", i.e. Jingle-Triple performance. Then move on.

Speak of the devil! 8:55. Hear loud Sen Rattle. Look up to see apparently single Sen perched 6 ft up in small trees or large bushes edge pond. More or less on pond side of this hedge-like vegetation. Bird sits. Preens. And then I see single Pygmy Kingfisher perched 5 ft, only a few ft from Sen, on land side of hedge! Pygmy makes flycatching flight. Returns to perch. Does several pronounced Headbobs. Then both birds fly away, almost simultaneously.

A few minutes later, see what is either a single Mal or, more probably, a single Sen fly out of hedge down to or toward surface of pond. I don't think that the bird actually touches surface. Flies on. This was either "flycatching," taking an insect just above surface, or an unsuccessful, "broken off," attempt to fish.

9:00. Pygmy back. Perches 3 ft up, pond edge of "hedge". Many Headbobs. Several accompanied by up-down Tailflips. Then flies to another perch. Facing "inland". Does lots more Headbobs and Tailflips. Not synchronized now. Looks around. Apparently for flying insects. Eventually disappears (while I am writing). Then I see it plunge down to pond. Definitely breaks surface. Apparently gets prey. Back to perch. Down to pond again. Breaks surface. Back to perch. BW. Preens. Headbobs. Tailflips. Then repeats whole procedure again. Preens particularly vigorously this time. Also general shakes.

Lilac flies over pond. Silent and alone. Apparently hawking for insects 4-10 ft above surface of water. Apparently unsuccessful.

This pond certainly is used by a lot of different kinds of Coraciiformes. (But why no Pieds?)

Pygmy is gone now. But Sen flies in. Lands without display 7-8 ft up in hedge. Pond side. Just sits.

Lilac does more hawking.

There also are lots of swallows hawking near surface. And at least one (white rumped) swift from time to time.

Sen ignores people passing by. Starts to preen. Makes no effort to catch flying dragonflies. Then 9:31, flies down to water. Definitely puts bill into surface. But not head. Small splash. Definitely catches something silvery. About 1 cm long. Fish? Flies back to perch. Lands with silent Wingspread. Swallows prey. BW's. Sits.

Hear Bluebelly Chatters and Rattling chatters in neighborhood. Look up to see single ind. perched 30 ft up frond of distant R palm. Also 2 inds. 15 ft up in small dicot, probably 150 ft away from first bird. One of the 2 is smaller, and possibly duller, than the other. All very sluggish. Smaller of 2 inds flies over to join solitary ind on R palm. No Greeting. No display. Except possibly Looking (down) by smaller bird. Then smaller bird flies back to rejoin first companion in dicot. Again apparently no display. Is this family group? Parents with one young?

Everyone sits. Then larger ind. of "pair" flies off. Perhaps chasing pigeon or Lilac? Does not come back immediately.

NOTE: the small ind. may be somewhat dull. But it is definitely blue underneath. Its first companion had long tail streamers. I.E. the 3 birds may well be 1♀ and 2♂'s.

9:50. Nothing more happening. Leaving myself.

I went to Bignona etc. this afternoon. Coming back, saw a single Pied still fishing, near Ziguinchor Bac, as late as 6:45 p.m.

Ziguinchor,
October 31,
1976

Go to Djibelor forest in afternoon. 5:20 p.m. Clear and

hot. Birds generally quiet.
Hear Yellowbills in distance. Nothing more of interest.
On way back, see 2 more Yellowbills flying W, as usual at this hour. Also 1 Bluebelly perched 30 ft up in dead tree in rice fields.
ADDITION: O saw Abyssinian near Nyassia at midday.

Ziguinchor
November 1
1976

Going to try forest of Djibelor again this morning. Arrive 6:30 am. Clear and calm. Just getting light. Not much noise except for pigeons.
Some more noises by 6:50. Mostly passerine.
The place is full of squirrels, Heliosciurus gambianus.
Hear series Yellowbill single Whistles 6:55. Then bird flies over tall trees uttering accelerated series abbreviated Whistles. Apparently alone. Then I hear lots more ordinary single Whistles not far away.
Some more bursts Yellowbill Whistles 7:13. Singing birds obviously high in tall trees. Also flying. From E? At least several inds. involved. Probably answering one another. Quite vocal on the whole. Still in breeding condition?
Then quiet again.
7:35. Near edge forest and open fields. Hear what sounds like Bluebelly Rattle-Slur. Only one phrase.
Then more Yellowbill Whistles in distance. Some accelerating to Triplets.
Then see 2 Yellowbills 40 ft up in tall Fromager. Edge rice field. Fly off. Apparently followed by 3rd ind.
NOTE: this third ind. was Whistling a few minutes ago. At which time, I heard peculiar "Tuk-a-tuk-a-tuk-a-tuk-a....

sounds coming from area where pair seen shortly afterwards. A form of Rattle?

Another Bluebill Rattle or Rattling Chatter in distance. Apparently from trees, R palms, in fields.

Yellowbill suddenly flies out of large Fromager in forest with accelerated abbreviated Whistles.

8:00 am. See group of 3 Yellowbills perched 15-20 ft up in dead Casuarina in "hedge". 2 inds are preening in apparently relaxed manner. The third is Whistling excitedly. Single-Triplet performances with usual movements. Finally the third ind. flies off. This looked like a territorial encounter. (Note: there was a large hawk — Gymnogenys? — perched 10 ft away in same tree during whole encounter. But none of the hornbills seemed to pay any attention to it.)

8:06. Hear what sound like single Blackbill Whistles in distance. Apparently low intensity.

8:23. Three small dull colored mongooses run across road.

Still more Yellowbill Whistles. Several inds. flying from tree to tree in forest. Over wide area.

Everything very dull. Leaving 8:35.

NOTE: the forest here is lush and varied, but possibly peculiar. Almost certainly second growth. Includes R palms and mangoes. Still it is remarkable that I couldn't find any kingfishers this morning. There seemed to be plenty of habitat for Mal, or even Sen. Perhaps hornbills and kingfishers are (also) mutually exclusive to an appreciable extent???

Go out to Magnus for picnic at mid-day.

On the way, see single Abyssinian on wires over second growth scrub. Silent and alone. Flies down to scrub, probably not to ground itself, apparently to catch insect.

At Magnus, we go down side path.

Hear a few conventional Mal Song phrases.

Then, much later, hear a few Sen Song phrases.

These two species do try to "keep out of each other's way"!

12:35 p.m. Lots more fen song. Phrase after phrase Bordeboi only at very top of "usual" fromager. Phrase after phrase after phrase again. Ind. apparently alone.

Go on along main path. Two Lilacs hawking over pond. Silent.

See a lot of rollers near highway on way back to Ziguinchor.

First, 3 Bluebellies and 1 Abyssinian, in that sequence, each 100-200 yds apart, along wires over mud flat and mangrove. Then 3 more Bluebellies, 2 together and 1 apart, in acacia trees over rice fields. Then a seventh Bluebelly in mixed vegetation outskirts of town.

I have still to see any interaction between Bluebellies and Abyssinians. Is this coincidence?

NOTE: Many birds in this region would appear to be active both in the morning and at mid-day, but not during the late afternoon or evening. Is this (another) way of conserving energy. Viz Louise Emmons' squirrels

Ziguinchor
November 2
1976

Start out for Oussouye. Clear and unbelievably hot. 1:30 pm

See 2 single Abyssinians, perched alone wires over open places (marshes). One on either side Niambalang (Oussouye), Kamobeul Bolon, Bac. Also 7 Merops bee-eaters past bac. I presume *persicus*, but I did not stop to check species. One apparent group of three inds., another apparent group of 4 inds. But all inds., even members of same group, at least several hundreds of feet or yards apart from one another. On wires or hawking for insects over water and marsh.

These bee-eaters certainly seem to be less tightly gregarious than Cunis. More like Rollers in being dispersed. This is doubtless correlated with ??.

Starting back from Oussouye 3:50 p.m.

✓✓ 3:53 Single Abyssinian, silent and alone, on wires over marsh. Twice flies down to gravel road itself, catches large black insects (beetles?). Swallows them. Back to wire. Does Tail raise on each landing.

4:20 p.m. Well! Well! Well! Some distance further along marsh. See another single Abyssinian perched wires. Stop car near by. Bird starts to utter "Arrh" Notes. Then flies off and up. Up to perhaps 40-50 ft up. Vocalizing all the way. Many single "Arrh" Notes, also triplets and doublets. Then the bird starts to fly in very regular circles, perhaps several hundred yds in diameter. Even wingbeats. Continues vocalizing. But now calls "settle" down to regular Doublets — — — — — — — — — — — — — — ...... Then the bird "stalls". Plunges back to original perch on set wings. Rocking from side to side and perhaps zigzagging a little as it does so. Also changes call to series of fast urgent, eventually single "Arrh" Notes — — — — — — Probably increasing in loudness. Then perches as before. Uttering single "Arrh" Notes at a slower and more irregular rhythm.

Then another Abyssinian flies by, perhaps 50-60 ft up. Straight flight with regular wingbeats. Apparently silent. Perched bird immediately flies up in "pursuit". Perhaps 100 ft behind (and slightly below). Also fast regular wingbeats. Uttering medley single, Doublet, and Triplet "Arrh" Notes at first. Then, again, settles down to regular Doublets. Continues in straight line for some distance. "Pursued" goes off to dist ant R palms. Pursuer swerves in a fast curve → Flies (20-30 ft?) higher. Does an "upward swoop"

Commences plunge also many single

Stalls. Glides back toward earth set wings, extreme "Rocking" and some zigzagging. I think that this was accompanied by "Arrh" Notes, possibly rapid series notes, but I am not quite sure about this.

Bird breaks off plunge some feet above ground. Flies off to R palms. Presumably to join or continue chase of "pursued". I can hear more "Arrh" type Notes in this direction.

COMMENTS: This sort of performance must be (the equivalent of) "real" rolling!!!

Its relationship to the aerial display of Mal is obvious.

Again Coracias and Halcyon are remarkably similar.

It is possible that these Abyssinians have come south to breed (not, as I supposed, to leave the breeding grounds).

4:55. Some distance further along, see 3 Pied Kingfishers perched on wires over water part marsh. 2 ft apart from one another. 2 ♂'s (again!) and 1 ♀.

No (more) bee-eaters before I reach Bac 5:00 p.m.

ADDITION: I heard a Mal singing (as usual) on the other side when I was waiting for the ferry on my way over.

Then 5:03 I can hear a Mal singing apparently on this side. There must be several Mals in this almost pure mangrove environment. And one ind., at least, has stayed around for weeks now.

As far as I can tell, the songs being uttered now include both conventional and Multi-Intro phrases.

5:25 (approx). Part bak. First see single Pied Kingfisher (♀), then single Cinn, then single Abyssinian. All on wires over marsh and ricefields 400-500 yds apart from one another. None is doing anything of interest. Comment: there is a very great variety of Coraciiformes in actual or potential competition with one another in these flat, comparatively "open" habitats. 1-2 kingfishers, 2 rollers, 2 bee-eaters, and probably other things as well. This group is overwhelmingly dominant here. Doubtless also domineering.

5:31. Same area. Hear Yellowbill whistles in distance.

Then see another Abyssinian a few hundred yards further on. Also on wires. Also silent.

COMMENT: I think that I can start to make some generalizations.

① Type of social structure does, naturally, depend upon ecological factors. Especially feeding habits. In the case of Coraciiformes, there are only 2 main feeding types. A. Species that sit and wait for their prey to come to them, or come to their attention. This group includes Coracias rollers, Kingfishers, and Bee-eaters

Prey taken can be terrestrial vertebrates or invertebrates, fish or aquatic invertebrates, or flying insects. B. Species that actively go in search of food. This group includes Wood hoopoes and Hornbills. Food can be either small arthropods (and perhaps other animals)

It is only the members of the second group that are ever tightly gregarious.

② I have also been re-reading Emmons on squirrels and re-thinking the OW macaques and baboons. I should imagine that the frequency of pseudosexual and/or homosexual behavior may be positively correlated with degree of social "tension" that needs to be maintained. This "semi sexuality" is always used as a device to counteract destructive tendencies. In the case of the OW primates, the disturbing influence is the high aggressivity. In the case of some of the Coraciiformes, and some African squirrels, the disturbing influence may be the need for dispersal of inds. Doubtless because of feeding habits. But dispersal combined with the maintenance or frequent reinforcement of strong social bonds.

Ossouye,
November 3,
1976

Out to Ossouye again this afternoon. Mixed sun and cloud. Not as hot as yesterday. (It poured rain last night and this morning. Very late for this time of year).

See a lot of Abyssinians on wires in open spaces, marsh and rice fields, both sides Niambalang (Ossouye) Bac. 10-15 inds. All except two apparently alone. At least 500 m. apart from one another. The exceptional two inds were only 25 m. apart from one another. I did not stop to watch the birds. They seemed to be very placid at first glance.

Also saw 3 eaters. On wires. 10-20 m. apart from one another. Definitely Merops albicollis. All 3 inds. BW and smashing insects against wires. Insects quite large. Dragonflies.

This is approximate area where I have seen both M. persicus and Ami on previous days. Again rice and marsh. So bee-eaters also tend to have "trap door", "edit change", type arrangements among themselves. Like rollers. (Or Halcyon kingfishers?)

4:45 pm. Go on a little past Ossouye along road to Elinkine. Come to region R palm grove. Hear Blackbill Whistles. Then Yellowbill Single-Triplet performance. Quite sustained. Repeated. Sounds as if the birds might be in breeding condition.

Ossouye,
November 4,
1976

Going to work along road to Mamtalong Bac this morning. Looking for rollers and bee-eaters.

6:33 a.m. Still in town; still quite dark. Hear Mal Songs. Rather long conventional phrases.

More Mal Songs as I drive through town ca 6:45.

Reach area where the Abyssinian displays occurred a few days ago – I think. Clear and windless. 6:55. No Coracii forms around at the moment. Then I see a Pied on wires in distance.

One Pied joins the other on wire. Mild Twitter as Greeting. Then both fly off. Perch stumps in flooded field. Note: I think that these 2 birds are ♂ and ♀.

Going further down road 7:20 To region bare flats and mangrove edge rice. Hear lots of Mal Songs. Multiple Intros

7:35. Suddenly see single Abyssinian flying 10-15 ft above rice. Rather swerving. Hawking for insects? Then utters long irregular series of "Arrh" Notes. Sometimes in accelerated bursts. Then lands 40 ft up on frond live R palm. Sits quietly. Note: this R is part of grove. Grove also includes a few dicots. I.e. environment also looks suitable for Bluebellies.

Abyssinian disappears from view while I am writing

Just a few minutes later, see single Bluebelly perched 30 ft up on frond R palm same grove! Only 30-40 ft from where Abyssinian seen earlier. Sitting quietly. Apparently alone. Looking side by side. Fore head looks "puffy"? CR? Then the bird preens. (Note: it is certainly blue underneath)

QUESTION: Were the calls (and movs.) of the Abyssinian provoked by the appearance (or behavior) of the Bluebelly?

Situation unchanged 8:05 a.m. Bluebelly still sitting. (It has made <u>no</u> attempt to feed while I have been here.) Abyssinian still invisible. Presumably gone from area. Mal still singing frequently in distance.

Still no change 8:20. Going further down road.

Just a few yards further on, see group 4 <u>Merops albicollis</u> ("White face") perched wires. 2-3 ft apart. Apparently silent. Feed by flycatching and hawking over road and adjacent sand flight. Then, possibly disturbed by me, fly up high and far away. I.E. they probably have very large ranges here now.

While I am watching the Whitefaces, I hear a whole burst of varied <u>Coracias</u> noises in R palm grove behind me. Apparently both Bluebelly and Abyssinian involved. Sounds like interspecific dispute. Lots of Abyssinian "Aruh" type notes in various rhythms and arrangements. Lots of Bluebelly type Rattles. Probably also Chatters. One Rattle-Slur rather late in the proceedings. Unfortunately I can't catch even a single glimpse of the performing birds. Apparently flying in treetops within the grove. And everything calms down after 3-4 minutes. No one visible now 8:35 a.m.

Mal(s) still singing.

Now I see that there is a man frightening away birds from rice field on far side R palm grove. Did he disturb the rollers?

I go further down road. Almost to Bac. I don't see any more Coraciiformes. But I do hear at least several more Mals singing. Apparently all in mangrove. This species certainly is <u>the</u> "mangrove kingfisher" of the region. It does have a peculiar mix of habitats.

Start back up road 9:00 a.m.

9:07 See Whiteface(s) and swallows hawking for insects over same rice fields.

Then a Giant Kingfisher flies by. Disappears in mangrove swamp in distance. Apparently silent

9:15. See single Abyssinian, silent and alone, perched top wire pole. Apparently ignores Pied Kingfisher perched wires a few yards away. (And vice versa, of course, as would be expected.) Then Pied flies off. Back. Lands only a foot (perhaps less) from Abyssinian. Still no reaction between the 2 birds. or species. Abyssinian preening in apparently relaxed fashion.

9:28. Outskirts of village of Mamdalang. Single Senegal flies up into tree near pond. Perches 30 ft up. Sits silently.

Some distance further on, see single Abyssinian on wires. Flies away to further perch when disturbed by passers by.

Start out along same road 4:30 p.m. Hot. Sunny. Windy. Storm clouds in distance. (This late in year!)

See single Pygmy perched wires over flooded rice fields.

Then see single Abyssinian perched wires over dry rice fields. Silent and alone. Preening placidly.

Three Pieds being noisy on ground, or dike in distance. Lots of Fluttering with CR and Wingspreads. Wingspreads obviously very hostile in this species. Birds. are walking on ground.

Continue further down road until I hit rain 4:58 p.m.

Drive back out of rain. 5:12 p.m. Find 2 Abyssinians on wires only 100 ft apart. Probably "pair" seen on earlier days. Both birds. quite silent and placid. Just facing into wind.

Ossouye
November 5
1976

I think that I will try road in direction of Parc Cand (Cap Skirring) this morning

6:28 a.m. Still in house. Still quite dark. Hear several

Sen Songs. No Mal audible at the time. Sen shuts up. First Mal Song phrase 6:31. Single phrase. Silence. Then more Sen Songs. Quite a lot of phrases. There would certainly appear to be some inhibition of Song between the 2 species! Sen (s?) still singing when I start to get into car 6:40 a.m.

Reach stretch high Parc forest along road 7:01 a.m. Miscellaneous bird sounds. Can also hear monkeys in trees. Turacos grunting in distance. Then I hear Yellowbills. Apparently several inds. Single-Triplet performances. Then birds shut up.

The monkeys here now are almost certainly Bay Colobus. As usual. There is also at least 1 pair of Heliosciurus around. Possibly the (darker) forest form.

Walk back and forth along road until 8:05 a.m., without hearing or seeing anything more of pertinence, except a few Yellowbill Notes.

11:20 a.m. Back at the house. Group of 6-8 Purpurs flies overhead. Several inds. utter "Auh" Notes. Presumably species is (still) not breeding.

2:45. In house. Hear many series Yellowbill Single or Monosyllabic Notes. Each series includes many notes. In characteristic pattern. Beginning rather slowly and softly. Gradually becoming louder, shorter, more rapid and more urgent-sounding. Finally becoming "...Pee Pee Pee Pee Pee..." Not rising to Triplets. Ending more or less abruptly. Finally see the bird, just as it stops vocalizing. 30-40 ft up in large fruit-bearing tree (probably Ficus sp.) behind Prefet's house.
✓ Apparently alone. Eats one of the fruits. Flies away.

Go off in afternoon along road to Mambalang Bac

3:40. Near pond on outskirts village of Mambalang. Where Sen seen yesterday. See single Sen perched 25 ft up dead tree. Silent and alone. Flies away when disturbed by me.

3:53. Some distance further on. See single Abyssinian perched 20 ft up frond live R over bare earth with scattered low veg. (not far from pond). Silent and alone. Flies down to ground. Up again. Perches frond another R 10 ft up. Sits placidly.

Look behind me to see single Bluebelly. Perhaps 1500 ft away. Perched 25 ft lower branch large Fromager. Over much the same kind of low scrub veg. as the near Abyssinian. Also silent & alone.

See another Abyssinian flying away in distance. None of the nearby birds seems to pay any attention.

Then nearby perched Abyssinian utters a few single "Arrh" Notes. Soft and short. And I see that there is a second Abyssinian perched 12 ft up in heart Borassa palm. Halfway between first Abyssinian and the Bluebelly. Then I see a third Abyssinian perched approx. 1000 ft further away (perhaps equal distance from Bluebelly). This third Abyssinian also utters notes. Long "Arrh" type notes. Almost rolling r-r-r-r-r-r-r-r (I shall call these "Rattling Arrh"s for the moment.)

Then third Abyssinian flies over second. No display. On to vicinity of first. Lands in R palm. The first palm visited by the first Abyssinian. The first is now in adjacent R perhaps 15 ft away. First flies away without display a few seconds after third lands. Disappears.

Third Abyssinian just sits. So does second on its Borassa.

Then I see that there are 3 Bluebellies in the Fromager. Apparently paying no attention to Abyssinians.

And 2 Blackbells (definite) fly into R palm several thousand feet from both Bluebellies and Abyssinians. Both Blackbells do Single-Doublet performances, with characteristic movements. Then move on. I lose sight of them.

Then second Abyssinian flies over to join third. Short, somewhat Chattering type, series "Arrh" Notes by one or both birds as "landing" and/or "greeting". Then the 2 birds stand side by side, facing in opposite directions, in semi-hunched postures. Both relax.

Both start to feed. Flying down to ground separately. And landing on different perches between feeding sources. Feeding seems to be quite silent (in contrast with Jen).

Obviously, what we have here is a "group" (whatever that means) of Bluebellies. Adjacent to pair of Abyssinians. Which are in turn, adjacent (or partly overlapping) at least one other Abyssinian

Some of the feeding pounces of the Abyssinians seem to be unsuccessful. At least one, however, is obviously successful. Insect caught. Perhaps a smallish dull-colored moth or butterfly ??? Swallowed without BW or pounding. Not distasteful.

Now, 4:37, all the birds are gone except for one Abyssinian in distance. Then it disappears too.

ADDITION: I say that a pair of Pied Kingfishers landed in bush in middle of pond while I was writing. At least one Abyssinian still nearby at the time. No obvious reaction between the 2 species. NOTE: the Pied does seem to be outside the web of interspecific relations connecting the rollers and probably the Halcyon kingfishers among themselves.

4:50. Further on. See single Abyssinian top wire pole. Silent, stolid, and alone. Pays no attention to Pieds flying (chasing one another?) not far away. Pied flies over Roller without vocalizing.

A few hundred yards further on see single Bluebelly perched 5 ft up in mangrove bush edge stretch water (brackish?) and Spartina-type marsh. Then see another Bluebelly 300 yds away across road. Perched in similar situation at similar height.

COMMENT: the Bluebelly seems to inhabit mangrove and marsh habitats more frequently, or extensively, than does Abyssinian. In some ways, the ecological difference between the Bluebelly and the Abyssinian parallels the difference between Mal and Sen. Note also concordance of size differences.

5:00 p.m. Still further on. See 2 Abyssinians perched 100 ft apart on wires. Silent. One flies down to edge road. Up again. Apparently without catching anything. Note: this is approx. area where Abyssinian, Bluebelly, and Whitefaces were seen yesterday. Neither of the latter species audible or visible now. Little man is throwing stones.

COMMENT: Obviously the Bluebelly and the Abyssinian have broadly overlapping habitat preferences here. Yet they are usually kept apart, even now. Apparently by microgeographical separation rather than pure social segregation per se. Doubtless the separation is occasionally reinforced by overt hostility (disputing). But perhaps not frequently.

Members of different species probably do not treat one another as different members of the same species. Intra- and interspecific fighting may take different forms. There seems to be less continuous or close monitoring or escorting during disputes between species than during disputes within species. (Or at least this is my impression at the moment)

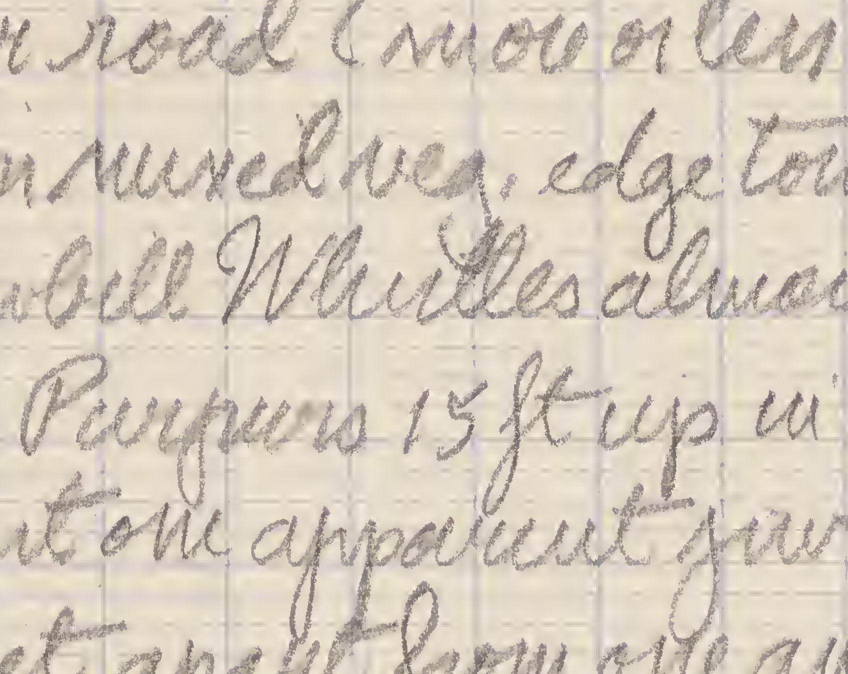
Ossouye
November 6
1976

At house. No Halcyon songs of any type at earliest dawn!

Go down another road (more or less N - to Mlomp?) when I start out. Park region mixed veg. edge town.

Hear some Yellowbill Whistles almost immediately 6:53

Then see group 4 Purpurus 15 ft up in live R palm. At least 2 adults (red bills). At least one apparent juv. (black bill). Hopping about a few inches and feet apart from one another. One or two ind(s) utter(s) single "Auk" Notes! These are more or less "clear", not hoarse or harsh. Then 2 inds (adults) do Bowing-Rattling Chatter performance side by side, facing in same direction. This could, perhaps, be considered a form of "Greeting". Bowing is highly ritualized, but perhaps less extreme than some other performances I have seen. Up phase is sort of O, low phase is sort of LO. Neither with neck very extended high upward over head & neck movement.



But tail is Whipped back with each down phase, even when is not very great.

Rattling Chatter is loud, harsh, short notes. Continued through phases. hoarse, varied. May both up and down

Whole body and (slightly drooped but not spread) wings throb with the effort.

Bowing-Rattling Chatter stops. One ind. utters more semi-clear "Auh" Notes. Then all 4 straggle over to large (leafed) Acacia 30 ft away. Land 4-15 ft apart from one another. Start to scramble and probe in apparent search for food. One ind. flies to land beside another. Apparently utters low, wooden sounding Rattle in flight. The two birds do "Greeting", Bowing-Rattling Chatter, as before, side by side. Then stop. Stand side by side. One in "HO", pecks at branch repeatedly. Then scatter for more searching for food. More pecking at branches. Probing BW's.

Then all fly away in usual straggling fashion. One ind. utters several "Auh" Notes in flight. These are not clear. Quite harsh, hoarse and nasal. Quite like most of the notes I have heard on previous occasions. I shall call this type of sound "Nasal Auh".

7:25 a.m. Several hundred yds down road. See group of 4 Purpurs 15-30 ft up in dead tree over mixed veg. I think that this is same group seen earlier. (Although it is not the direction in which they seemed to be going when they left.) Some scrambling & probing for food. A lot of auto preening. Several of the Purpurs repeatedly supplant a drongo (very forked tail) and a couple of dull brown thrush-like birds (Turdoides?) in same tree. Supplants apparently silent. Then one Purpur flies to join another. Greeting of Bowing + Rattling Chatter. Down phases very extreme this time. (Doubtless variation is partly dependent upon perch). Stop. Then one ind. preens neck feathers of the other. Then both auto preen. Separate. Whole group flies away. Uttering irregular, not very accelerated, Chatter of 6-7 Nasal "Auh" Notes as they go.

While I am watching Purpurs, I hear lots of whistling "Wheeaah wheeh" phrases some considerable distance away. These are the phrases that seemed to be "connected with", to stimulate, Mals at Boukot Deola. I can't see vocalizing bird now. Nor do I hear any (unmistakable) Mal sounds in the neighborhood.

NOTE: I should not be surprised if the local group of Purpurs included 3 adults and 1 young. Another "skewed" sex ratio ???

7:46. Yellowbill sounds. Series of accelerated Whistles. Appar

entity by several inds. Not close together. Then I see one of the birds. In R palm over mixed veg. Flies away. Several other inds. continue calling as before. See one of them. It is 50 ft up large Fromager over mixed vegetation. Apparently alone. Continues to vocalize. Many series. Some rising to Triplets, with "Bowing" and upward flourishing of head and bill. Then bird flies away.

Going to Drive further down road 8:05. Go for several miles through R palm plantations, mixed scrub, occasional rice fields. Stop 8:15 area mixed veg. with R's and Teak. Probably edge Forêt de Kaène

Hear Mal Songs in distance. Nothing more. Go on further

9:00 a.m. Reach outskirts of town. Presumably Radjinal. Area of overgrown crop field (covered with low purple-flowered Ipomea type shrub) Plus scattered trees of various kinds. Mostly low. See Bluebelly perched 8 ft up in unidentified dicot. Presumably ♂ (large, with longish streamers). Silent. Then see another Bluebelly perched 8 ft up in Kade (putting out leaves) 10 ft away. Presumably ♀ (small apparently without streamers — distinctive because of disarranged feather on back). Also silent. Twice ♀ flies down to ground. Can't tell if she gets prey or not. The second time she flies up to land approx. 4" from ♂. Mutual "Greeting": Low muffled Rattling Chatter by one or both inds. Then both stand in more or less Agg V. ♀ (not ♂) does several back and forth AF movements.

Both stand, looking more or less alert for some minutes. ♀ "looks away" from ♂ more often than he looks away from her. This sort of interaction does not seem to be ritualized per se; but it is certainly significant.

Then I see 2 Purpuros in crown R palm 100 ft away. One adult (red bill). One presumed juv. (dark bill). Purpuros would seem to have young out of the nest now! Both inds. busy feeding vigorously on palm fruits. Presumably probing into pulp. One adult picks up fruit in bill, throws it up in air, catches it again. As far as I can tell, at this distance, both Purpuros are silent. Certainly no Bowing.

The Bluebellies seem to ignore Purpuros. ♂ Bluebelly eventu

walls flies down to ground. Can't see if he gets prey or not. Flies up into small Kade (the same tree in which ♀ perched earlier). Then drifts away. ♀ follows. Both out of my sight for the time being. Obviously have gone some appreciable distance (probably several hundred yds).

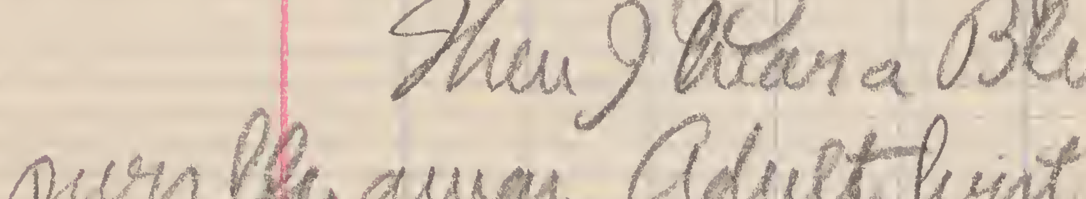
Almost immediately the 2 Purpurs come in much closer. Land low on trunk small kade (not the tree used by the Bluebellies, but only 30-40 ft away). Only 1-2 ft above ground or level ground vegetation. This is the lowest I have ever seen Purpurs! Immediately start probing for arthropods in crevices and holes of trunks. Gradually but very irregularly work their way up trunk and then large branches. (They are much more irregular than treecreepers or dendrocolaptids). Once the adult apparently passes insect to juv. No display. No Begging by young. (Note: the fact that these 2 birds are so quiet is an indication that much of the vocalization in other circs. is largely (or completely) hostile.)

Then I hear a Bluebelly Rattle-Flur in neighborhood. The 2 Purpurs fly away. Adult first. In general direction from which they came. Still silent or quiet.

Then I see that there is pair of Bluebellies perched 4 ft up on stump 10 ft from the Kade where the Purpurs had been.

Obviously the Purpurs retreated before the Bluebellies. Even without being attacked!

The 2 Bluebellies sit. More or less in Agg V. Then ♂ begins to vocalize. Continues for several minutes. All vocs. are rather slow loud "Chatters" of "Auk" Notes. Usually in Doublets, Triplets, or Quadruplets (perhaps an occasional quintuplet?). First note of a series always the loudest. Later notes softer and descending. or

 Bill opened and closed widely with each note. I can't see what is provoking this performance.

But then suddenly a third Bluebelly (also ♂?) appears. Fly in from several thousand ft away. About 15-20 ft above ground. Utters Quadruplet "Auk" Note series (just like that of the perched bird), Soars upward (beating and then set wings, I think) a few

feet. Then glides forward and downward a few feet. Flies on silently. Lands 30 ft up in dead tree 100 ft from pair.

✓ Addition: I know that this is same pair seen earlier. ♀ has disarranged feather.

All 3 birds sit. ♀ of pair silent. So is third ind. But ♂ of pair continues Doublets, Triplets, and Quadruplets as before. (It is interesting that he is uttering these sounds rather than Rattles. Presumably he is not very aggressive. Perhaps frightened?)

Then third ind. flies on. Both birds of pair follow. Obviously escorting. All 3 fly E. As they go, I see one ind. do (another) Quadruplet "Auk" Chatter → shallow Soar → shallow downward glide performance. Can't determine precise circs. Or even which ind. is the performer. This is certainly the equivalent of "Rolling"!!!

Then all 3 inds. disappear from view.

Addition: while both the Bluebellies and the Purpurs were around, there were at least 3 Yellowbills being noisy and active a few thousand meters away. Single-Triplet Calling. Flying from tree to tree. Neither the Bluebellies nor the Purpurs seemed to pay any attention.

Leaving 10:15 a.m.

Start out, on foot, on same road to Mlomp 3:50 p.m. Hot. Still. Storm clouds building up in distance.

Walk along side path and through a great variety of different types of vegetation, including forest, R palms, and peanut fields.

4:23 Hear Blackbill calls in distance.

4:53 See 3 Purpurs in R palm over peanuts. One sits quietly with

✓ insect in bill. Then the inds. move off. Out of sight. But I can hear occasional nasal "Auk" note. Oho! Also see single Bluebelly on R frond only a few yds away. Bluebellies and Purpurs do seem to have similar habitat preferences in this region! Could they be associated in any closer, more social, way????

Bluebelly also moves off. Out of sight.

Is the similarity of voices between Bluebelly and Purpur a case of social mimicry???

NOTE: This is a very, very extensive stretch of peanut with R. Obviously over a mile long. It appears to be very uniform. This makes the coincidence of Bluebelly and Purpur all the more remarkable.

The Bluebelly has a typical Roller voice. Does the Purpur have a typical wood-hoopoe voice? If not, and if mimicry really is involved, then it is the Purpur that is mimicking the Bluebelly, rather than vice versa.

Walking back along path. Same veg. Hear more Blackbill Single Double performances. Then see bird flying just above tops R palms over peanuts. Silent in flight.

COMMENT: I suppose that the Bluebelly and the Purpur might have concluded an "alliance" because they prefer the same habitats but still do not compete with one another too strongly.

Ossouye
November 7
1976

Working same place today as (later) yesterday morning — where both Bluebellies and Purpurs seen. Arrive 7:00 am. Clear and calm.

Arrive in midst of Yellowbill activity. See 2 pairs of Yellowbills. Each in Kade. 8–15 ft up. Only 30 ft apart. Over pasture. This is remarkably open country for the species. One ind. of each pair is doing lots and lots of Single-Triplet performances. Classical in form. All the appropriate movements. Phrases of the 2 inds. overlapping at random, or perhaps tending to coincide. As far as I can tell, the mates of the vocalizing inds. remain silent. At least quiet.

Then suddenly the birds fly up. And I can see that there are 6 inds. present. All fly off W. Some Whistles in flight. Then the birds fall silent. They begin to glide. Long almost horizontal glides. Much more glide than usual for the species. 2 inds. continue to W. The other 4, still gliding, curve off to the NE (direction of village).

COMMENT: these birds seemed to be coming from a (presumab-

by) communal roost to E, stopping for "check in" — "communal display" on the way. Then proceeding to drop off individual pairs, each in its own territory. All very reminiscent of Blackbill and Redbill!

7:15 a.m. Lots of miscellaneous birds in trees visited by Bluebellies yesterday. But no rollers yet. (There is a man tapping palm nearby)

Hear occasional Yellow-bill sounds, but all far away. Then see single Yellowbill 10 ft up in Kade over pasture quite close to me! Silent. Moves from perch to perch. Goes down quite low. Out of sight. Then another Yellowbill flies and glides in silently. Lands same tree. Apparently no greeting. Both fly off.

7:31. Hear first Rattling Chatter in neighborhood.

Then more Yellowbill sounds. Vocalizer is 20 ft up in Acacia. Falls silent. Moves branch to branch. Flies off. Lands in Fromager. Near another ind. No Greeting. Both move off.

NOTE: this sort of environment looks more suitable for Blackbills, or even Redbills; but there is no doubt that Yellowbill is dominant. Very abundant in fact.

Everything quiet 7:50. Doing some sketching.

ADDITION: I forgot to mention that I saw one Yellowbill perch for some seconds with large dragonfly type insect in bill tip. ✓

Well! Well! Well! 8:15 a.m. Three Yellowbills fly from R palm to R palm over field. Accompanied by constant rapid "teeteeteeteetee teeteeteeteeteeteeteetee . . . ." Rather high pitched and "tinny". This seems to be uttered by only one of the inds. One ind. whose bill color (the yellow) is slightly duller than usual (duller than the yellow of the other 2 inds at least). I presume that this vocalizing ind. is juvenile. And that the vocalization itself is Begging.

Finally the 3 birds settle in one palm for some minutes, move on to an adjacent acacia, on to another palm, and back to the first palm. Giving me a chance to see what is really going on.

Definitely a juv with parents.

Juv. continues Begging essentially without cease (except when

the Begging Call changes into, or is interrupted by, something else — see below). Bill seems to be kept slightly open throughout. I can't see mandibles moving. Begging accompanied by all sorts of unritualized postures and movements, normal perching and locomotory patterns. No-8. The young does tend to stretch head and bill toward a parent from time to time, but even this looks quite relaxed per se.

✓ Parents spend most of their time vigorously attacking the racemes of the R palms. Definitely tearing fruit off and out of cluster. I can't tell if the parents eat any of the fruits themselves. But at least one of them passes fruit to young. At least 3 times — definite. Young takes fruit and swallows it immediately, again without display.

Occasionally young pecks at a raceme itself. Rather halfheartedly. I don't see it actually pluck any fruit itself.

Every once in a while, the "Tee tee tee tee tee ....." is interrupted by very loud, harsh, tearing Rasp. "Tchiao" ——— Usually a single note. Once double. At least twice the Rasp was uttered as a parent gave food to the young. I couldn't tell if the Rasp was uttered by the parent or by the young. Perhaps the latter.

This seems likely because there were also occasional partly intermediate-sounding vocs. The "Tee tee tee tee tee tee ....." notes would become louder and harsher than usual for some seconds, before resuming their usual thin, tinny, softer quality. Once this occurred when the young was flying after a parent who had flown on to an adjacent tree. These series of harsher notes sounded quite like Chatters or Rattling Chatters of rollers and Purpurs!!!

There was still a third (or fourth) variation. Every once in a while, the "Tee tee tee tee tee ....." notes would become louder, clearer and more whistling. Quite like "Peee peee peee ....." Whistles of adults. It seems likely that Whistle performances of adults develop from Begging in the course of ontogeny.

NOTE: All this suggests that the series of Whistles by hornbills are homologous with Chatters, etc., of other Coraciiformes. Which is what I thought anyway.

Eventually the 3 birds move on and disappear.

How come I never saw them before? Did they just come in and move through the area? Are they nomadic at this phase of the cycle? Why didn't any of the other Yellowbills that were around earlier this morning, and which I imagine must still be in the neighborhood, intervene or at least appear while all this brouhaha was going?

Is there a connection between post- or non-breeding behavior and the performance of "communal displays" at dawn? (Or did I see the communal display this morning simply because observational conditions were unusually favorable. Open vegetation, etc. ???)

8:56. Hear a few Mal Songs in great distance.

Then hear what is probably Chattering Rattle fairly close by.

And immediately see a single Whiteface land 8 ft up in small tree ✓ Snapping head and bill side to side. Apparently dislocating insect. Flies off.

Then hear another Chattering Rattle. Who is uttering these sounds?

9:03. See Whiteface fly into shade. Apparently alone.

NOTE: I seem to be using terms "Chattering Rattle" and "Rattling Chatter" interchangeably.

9:05 Curiouser and curiouser. See 2 Whitefaces and 1 *M. persicus* ("Green") perched 2 ft up dead bush middle *Ipomea* field. The 2 Whitefaces are 6" apart from one another; the Green is about 1' from nearest Whiteface. Apparently the 2 species are associating! Then a 3rd Whiteface flies in, lands 2"-3" from one of the others. The two birds turn toward one another, apparently Gabbling! And the one that has just landed does brief Wingspread! Rufous of wings conspicuous. I can't tell if this is ritualized or not (it could be simply balancing).

SEE NOTE "Green" may be Diversicolor

All birds sit. Then Green flies away. No one follows immediately. Then one of the Whitefaces is supplanted by a swallow (dull sand-martin type).

After writing this, I look up to see both Green and Whitefaces flycatching over *Ipomea*. Sometimes perching in same bush(es). Sometimes not.

Also hear a few of what sound like Blackbill Whistles in neighborhood. Can't see bird(s).

As would be expected, the Whitefaces seem to be associating with one another rather more closely, on the average, than with the Green. But there is no doubt that all the birds are "together" in some sense.

Flycatching and hawking for insects 2-10ft above ground.

9:22. Two Purpures fly into Acacia (not Kale). Apparently adult and juvenile seen yesterday. Silent. Probe for insects on branches. Apparently ignore Whitefaces flycatching a few feet away. Then move off into more distant scrub and low forest.

Lots of children around now. With drum! I am going to walk along side path for a while. Back.

✓ Whitefaces still around. One ind. lands on perch with what seems to be large fly in bill. Shakes it vigorously. Swallows it. Flies off. Other inds. of same species are using both Mango and R palm as perches between flights.

Their flycatching (probably literal) seems to be very successful. Birds shake head & bill almost every time on landing.

The Green seems to have gone.

Leaving myself 9:30 a.m.

This morning was (another) good example of the "on again off again" phenomenon. Where, for instance, were the Bluebellies today?

✓ ADDITION: While I was away, a pair of Yellowbills visited the Teak tree behind house Nipping off, and apparently eating, flowers (and/or buds?)

CORRECTION?: Looking over books, I think that the Green Bee-eater seen today was Merops hirundineus. Blue abdomen and under tail coverts (I think that I also remember blue border to yellow throat).

QUESTION: Why are bee eaters so quiet? Because they are small (and exposed - vulnerable), and also often in close proximity to one another?

Osonye
November 8
1976

Going to work around the town (and house) stuff this morning.

First Sen Songs, rather faraway, 6:40 a m. Phrase after

phrase in rapid succession. But they stop at 6:45

It is rather cloudy this morning. No wind.

A fair amount of bird sound by 6:55. But no more Coraciiformes yet.

7:01. Beginning road to Parc and Cap. Edge town, trees, and open field. Hear single Rattling Chatter. Bluebelly? Then several more, identical, phrases.

7:03. First Yellowbill Whistles in distance.

I go in general direction of Chatters. Find 3 Bluebellies perched 30-40 ft up in dead tree, in field of grass and low shrubs. About 6-8 ft apart from one another, silent. Then a 4th ind. comes in Lands 8 ft from others. No Greeting. Then 2 inds. (not includ. latest arrival) fly off. Apparently go long distance. Some minutes later, a 3rd ind. flies into Kade 40 ft away. 4th ind. disappears from my view.

Was this a case of "early morning check-in"?

Now Bluebell (back) in dead tree. Ignores Egrets and Hooded Vulture landing same tree. But then flies off far away (in opposite direction from first birds). Lands in large Kade. Joined by bird from first Kade. Again no Greeting. Just sit, a couple of ft apart.

NOTE: this field presumably is pasture. The egrets are cattle egrets. There also are Piapiacs around.

Then see pair of Purpurs in another (third) large Kade perhaps 1000 m. from Bluebellies. Feeding in usual way. But certainly not going from bottom to top. Apparently quite silent. Fly away to more distant patch of forest. One ind. is notably shorter tailed than the other. A juvenile?

7:33. One of the Bluebellies still in same Kade as before. The other seems to have disappeared. But I see a single Abyssinian perched 25-30 ft up in fourth Kade. Also about 1000-1300 m. from the others. Microgeographical separation at work!

None of the Rollers has been seen to (try to) feed yet. Presumably insects are not yet active. Sun is just starting to come out from behind clouds.

7:41. Two Yellowbills fly over field. Silent. Coming from isolated patch forest. (Note: this might well be sacred forest.)

7:43. Abyssinian flies off just as Longtailed Glossy Starling comes into land. A supplant??? The Abyssinian goes only a few yds away to new perch same tree. Then flies off to distant (fifth) Kade. Lands 3-4 from another Abyssinian. Utters 3-4 "Arnh" Notes (Triplet or Quadruplet) as it comes in. The other bird just looks. Both sit. One preens.

Then group of 4 Purpurs comes in to same tree. Feed some yards from the Abyssinians. The 2 species seem to ignore one another. Eventually both species fly off. At about same time but in different directions. Purpurs utter single "Arnh" Notes in flight.

Go for a little walk into village without seeing anything relevant.

Back 8:07. The 2 Abyssinians are back. In Kade near the one in which they were last seen. 15 ft up. 2 ft apart. Both preening.

8:19. Suddenly both birds fly off. Can't see what stimulates departure. But one bird is certainly chasing the other. And in apparently hostile manner. With accelerations, apparent attempts to actually attack. And lots of "Arnh" Notes in rather irregular series. No "aerial display" as such. One ind., presumably the aggressor, eventually lands in nearby Kade. The other disappears.

Were these inds. really "rivals" all the time that they were sitting together??? Just monitoring one another? I think so. Shades of the Bluebelly! Territorial defense is peculiar in these animals.

NOTE: Before dispute, one ind. was sitting with its back toward the other. With wings drooped. Sapphire blue of lower back and rump conspicuous. I think that this was just "sunning" or "preening". But I suppose that it could have been a "display".

Remaining bird flies off 8:31 a.m. Don't see where it goes.

Then an ind., presumably same one, flies by, near me. Again utters "Arnh" Notes. Flies off in direction where Bluebellies seen earlier.

I turn around to walk back to village. As I go, I see one of the Bluebellies perched in Kade center of field, probably the exact same tree where the birds were seen at dawn. I shall call this ind. "I".

Abyssinian is nowhere to be seen at the moment.

A few yards down road, I reach small catholic cemetery. This area is several thousand feet from Kade in which I is perched. (And perhaps equidistant from trees in which the Abyssinians were sitting.) Suddenly I see a Bluebelly land on ground beside grave. I shall call this "II". (Subsequent events suggest that it is ♀ — see below). Stands in rather Agg V, probably with neck Fluffing. And then I see that there is another Bluebelly, "III", probably ♂, perched on stump, 1-2 ft up, about 3 ft from II. Also in Agg V, probably with Fluff. Then II flies up. Into small dead tree immediately overhead. Lands 10 ft up. Only inches from still another Bluebelly, "IV", probably another ♂ (II is considerably smaller than IV). II assumes extreme Agg V with _extreme_ Fluff on landing. Bill pointed strongly downward

Also carpal joints held way out. Very gull-like. Also or a wingspread. IV also Agg V with Fluff, but less extreme. Then II "relaxes" a little. Agg V becomes less extreme. _At which point IV flies on to II's back!_ II adopts semi-hunched posture, even raises tail. IV makes some balancing movements but does not, I think, lower tail. "Copulation" obviously not successful as a reproductive pattern. Then IV flies off. Lands about 1 ft away from II. Both II and IV stand in moderate Agg V with Fluff. Then make a few preening and BW movs. These might or might not be "displacement".

While this has been going on, III has continued to sit in Agg V & Fluff. Looking at II and IV. Then flies down to ground. Hops along a few feet. Then back to same perch as before.

NOTE: _All the birds have been quite silent so far._

Then suddenly II and IV fly off together. To tree in which I is perched. (As far as I can tell, I has not been paying close attention to the dispute. I think that it even flew down to the ground to feed once at about the same time that the "copulation" was in progress.) II and IV land together. About 20 ft from I. Probably with some Chatter or, more probably, Chattering Rattle.

III remains behind for a minute or so. Then also flies over to I's tree. Lands a few meters from I. Apparently no Greeting.

I would assume that II and IV are one pair. And I and III another pair. This implies that I is ♀. This seems to be born out by the size relationships, as far as I can determine them at this distance.

All birds sit. Then III or, less probably, I flies away. Out of sight. Then II or IV flies up to top tree. Sits equidistant from the other two remaining birds. Then there is more movement and I lose track.

COMMENTS: Certainly copulation or copulation-derived patterns are used, presumably as threat, during the disputes of this species. Some of these patterns may (no longer) have any direct connection with strictly sexual motivation.

I am assuming that the birds that copulate with one another are mates, and that the birds they copulate in front of are rivals. This is indicated by preceding and succeeding interactions. But it would be difficult to disprove the reverse hypotheses: that the birds that copulate with one another are rivals while the birds that they copulate before are mates!

I got the distinct impression that the II ♀ was (even) more hostile to III than was the IV ♂, but still afraid to attack. In effect her behavior may well have been "inciting". I think that I got the same impression of ♀(s) at Cap Skiring.

Oussouye,
November 9,
1976

We went into Ziguinchor late yesterday morning and came back this afternoon. Clear and very hot both ways.

We saw the usual Pied Kingfishers and Yellowbills, and heard Mels at the Bac, around noon.

We also noticed some other things.

Abyssinians have become really common. On wires and poles in most of the open flat areas; marshy fields of sedge as well as rice, etc.

This species certainly is more conspicuous, apparently more numerous than the Bluebell, throughout this Ossonye-Zugwehor stretch now. Most of the birds still appear to be single. Well spaced out. But we have seen several (4-5?) apparent "pairs", 2 inds only 3-10 m. apart. They seem to be more often paired now than earlier.

Coming back this afternoon, 3:20 p.m. Area of extensive sedge between Nyassia and the Mambalang Bac. Find group of 5 Whitefaces and 1 Carmine Bee-eater. All on wires. All flycatching in typical style. Whitefaces more active than Carmine (this would be expected in view of the appreciable size distance between the 2 species). When first seen, all inds. a few feet apart from one another. Silent.

Then 3 of the Whitefaces land close together. Almost touching. This provokes some squabbling. Probably some jabbing. Lots of rather soft, high pitched, rapid Twittering. And several definite Wingspreads by at least two individuals. Obviously ritualized. Kingfisher-like.

Then the Whitefaces drift over to dead bush in sedge, perhaps 50 m. away. Use this bush as a base from which to continue flycatching. Only a few seconds later, the Carmine also drifts over to use same bush as base in same way. I.E. the Carmine is definitely associating with the Whitefaces. Apparently following and joining.

It seems likely that Whitefaces are really passive nuclear. Vis the Green seen two days ago as well as the Carmine seen today. They certainly are more nuclear than the Cinns near Nagues.

I see several more Wingspreads when 2 Whitefaces try to land on same perch or one tries to land too close to another. Wingspreads seem to be primarily horizontal. The birds are too far away for me to determine if these later Wingspreads are accompanied by Twittering or not.

NOTE: I don't think that I have ever seen a bee-eater close to an Abyssinian. Perhaps they are repelled or excluded by the latter?

Farther on, between Mambalang Bac and Ossonye, 4:00 p.m., see single M. persicus on wire. Species identification definite. Silent and alone. (This is approximate area where several persicus seen a couple of weeks ago.) I shall call species "Persian".

It is remarkable how many new species of "flycatching" Coracii formes have come into this region since dry season began. 4 bee-eaters (Whiteface, Carmine, Green, and Persian) and one roller (Abyssinian) Two of them (Abyssinian and Whiteface have become common.

I don't suppose that the local situation can have become actually more favorable for birds of this type. There must be fewer flying insects around now than in the rainy season. But it must have become relatively or comparatively more favorable. I.E. the areas from which the birds came must have deteriorated more, or more rapidly.

Doubtless it is the impoundment of water for riziculture here that is determinant (and/or the extent of maggots?).

Ossouye
November 10
1976

First Sen songs in distance heard from house 6:35. Then 2-3 short song phrases by Mal closer by. Mal and Sen completely overlapping! Then Mal shuts up. Sen continues.

Going to walk down to area where rollers seen 2 days ago.

On the way down hear more short Mal songs. Sen no longer audible. Perhaps too far away.

No rollers at cemetery 6:43. Then walk thru field to look at Kades. Apparently no rollers 6:53 am But there are already Long tailed Glossy Starlings and a drongo around.

6:55. Single Purpur flies into Kade favored by Bluebellies 2 days ago. Utters several "Anh" notes (usual Nasal type) as it comes in. Then sits quietly immobile, 25 ft up. After a couple of minutes, utters one Rattling Chatter, with creak "cit. mons." of Bowing. Shuts up.

Almost immediately, 2 Bluebellies fly in. Land close together 10 ft from Purpur. Followed immediately by a third Bluebelly. Who lands only inches away from first two.

Purpurs starts to scramble and probe for food. Silently. Then flies off to patch forest. Silent and definitely alone.

The three Bluebellies preen vigorously side by side. This looks quite normal, relaxed and unritualized. No visible hostility of any sort!! All quite silent.

Then one ind. flies off. Over to fence in middle of field. Lands 2 ft away from a fourth ind. No Greeting. Both sit. Then, a minute or so later, the other 2 birds from Kade fly over to same fence. Land 2 ft apart from one another, 12 ft from other birds. No Greeting, display, or vocalization by any of the four birds. All sit. All rather hunched. All with plumage, especially black back feathers, rather fluffed. (Again, I think that this is not ritualized in these cases. The birds simply look cold. And it is cool this morning!)

All four Bluebellies sit for some minutes. Then a group of 8 Purpurs flies into dead tree (cut off at top) 15 ft away from fence. Purpurs feed vigorously. Silently, or at least quietly. One Purpur apparently feeds another. The Bluebellies apparently ignore the Purpurs, and vice versa. The Purpurs eventually straggle off.

Bluebellies still sit. One makes flight to ground. Back to same perch as before. Then one member of an apparent "pair" flies down to the other member. Lands out, walks away. Brief soft muffled Chatter or Rattling Chatter as Greeting.

All continue to sit. Then, 7:25, one bird (♂?) flies off out of sight. The other 3 inds. sit and sit and sit.

Then, 7:25, one of the 3 flies off to distant Kade. Leaving 2 inds. behind on fence. These two on fence are not close together. And I see that there are now also 2 inds. in Kade. Also not close together. (If my tentative identification of sexes is correct, then the 2 inds. in the Kade are both ♂, while the 2 inds on fence are both ♀!!!)

Then the 2 inds on fence also fly away. I lose track of identities and start to write up.

When I finish, 7:35, there are 2 inds. 4 ft apart, 25 ft up, in distant Kade, no other Bluebellies in sight.

Then these 2 birds fly off to another, third, Kade. And I see that there is (another) (third) Bluebelly in this third Kade. Some brief Rattling Chatter as "newcomers" arrive and land. Then all 3 indi. sit. Only 4" - 1 ft apart. Then one flies off. Out of sight. The remaining two inds. (♂ & ♀ now?) sit.

COMMENT: there does seem to be "checking in" within this group of Bluebellies. And the group shows definite traces of a 2-3-4 organization like that of the Bluebellies of La Paillotte!!!

It is conceivable that Purpurs may also participate in the "checking in."

Of course, the "checking in" does not have to be purposeful, or purposefully social. Birds may simply tend to congregate in trees that are particularly convenient, as preening or warming-up sites, at dawn.

7:43. Everything quiet. 2 Bluebellies in Kade. Others out of sight.

No! Correction! There is still a third Bluebelly around. Perched 30 ft up in dead tree 25 ft from other two.

7:48. Suddenly 2 Bycanistes fistulator appear!!! Fly out of patch of forest. (This is forest in which I have heard Yellowbills on previous occasions, including earlier this morning, while I was watching Bluebellies.) Fly over field. Perhaps 25 ft up. About 20 ft apart from one another. One of them may utter several single Corvus-form-like "Arnk" notes in flight. Both fistulators land 30-35 ft up in very large tree (fig?) edge village. Then fly on, further away, a few minutes later.

COMMENT: Bycanistes fistulator inds. seem to have very large territories or ranges, at least partly overlapping those of Yellowbills, and to be non-gregarious.

7:59. Now there seem to be 3 Bluebellies close together in Kade. Fourth ind. still in dead tree some little distance away. Still little or nothing in the way of obvious hostility.

All the birds are ignoring drongos in neighborhood. Also a Hooded Vulture carrying worm! Then bird on dead tree is displaced by the vulture. Flies off silently. To Kade. Lands 4 ft from other 3 inds. No Greeting. A brief outburst of Rattling Chatter a minute later. Then peace and quiet again.

Then 3 of the birds fly off. Probably disturbed by human passers by. One remains, sitting quietly. 8:10 a.m.

COMMENT: these Bluebellies certainly do not seem to be in reproductive condition or mood now.

Going to start walking around.

After I have gone some distance, I hear a typical Rattle-Slur behind me. Apparently uttered by Bluebelly apparently alone in Kade.

8:18. Find single Abyssinian alone 15 ft up in another Kade (this is same tree that an Abyssinian, presumably mine ind., favored 2 days ago – adjacent to Bluebelly territory.) Ind. utters lots of single "Arnh" Notes. Probably disturbed by my approach. Then it flies off across road. Chases and repeatedly swoops at another Abyssinian. Dispute accompanied by series of (more or less rhythmically) accelerated "Arnh" Notes, i.e. Chatters. But no aerial display per se.

Doubtless this dispute was provoked by my forcing one ind. into the territory or range of another.

COMMENT: I am beginning to think that the elaborate aerial display of the species, the equivalent of "Rolling" cannot be purely hostile. Presumably at least partly sexual.

8:30. Now the 2 Abyssinians are perched 16-18 ft up, 10 ft apart, in same Kade. One ind utters many single "Arnh" notes, in more or less regular rhythm — — — — — —
Looking from side to side. Then both fly off into more distant trees. Can hear "Arnh"s and Chatter in distance.

8:35. See 2 Bluebellies, apparently ♂ and ♀, perched close together 8 ft up dead tree by cemetery. Correction! There are 2 pairs here. The other 2 inds. are perched close together 2 ft below first pair. Some preening. Looks fairly relaxed. (Note: all 4 birds have well developed streamers. But there is considerable apparent size dimorphism. And the grouping now does seem to be ♂+♀, ♂+♀.

Hear Mal Songs nearby 2 inds. Short conventional phrases. No Sex or anything else relevant audible at the time. The 2 inds are partly overlapping one another

Then general confusion and chaos breaks out. One of the Bluebellies (♂?) flies down to ground. Apparently looking for food on sandy earth between graves. Hops several feet. Then flies off. To one of the Kades, about 1000 m. away, well within what seems to be Abyssinian territory (in the area in which the 2 Abyssinians tend to fight with one another). See rough map.

As might be expected, this provokes a vigorous dispute. Lots of aerial chasing and swooping. Fight involves at least one Abyssinian and one Bluebelly (presumably original intruder). Also 2 drongos, probably sucked in by mistake or attacked by redirection. Lots of Abyssinian "Arnh" Notes, and series of slightly accelerated "Arnh" Notes, i.e. Chatters. Also some Bluebelly Chattering Rattles. At the time, I cannot tell who is aggressing on whom. But I assume that the main "theme" of the dispute was the Abyssinian harassing the Bluebelly in an attempt to make it retreat.

NOTE: the Mals stopped singing just before the roller dispute began, or during its first stage. Then, when dispute is at its height, I hear one Sen Song. Long and loud nearly. It is possible that the Sen was stimulated by the general hubbub. But it did not participate (more) actively.

The drongos soon get out. And the two rollers land in Kade sort of half way between the usual territory of the Abyssinian(s) and the cemetery part of the usual territory of the Bluebellies. The Bluebelly lands in center of tree, about 15 ft up. It is quite visible to me. The Abyssinian lands on side, perhaps 12 ft up. Not very visible. It is obviously, however, very excited. Lots of "Arnh" Notes. In Regular measured rhythm. More or less as heard earlier this morning — — — — — —

The Bluebelly is less excited, or more stolid, but certainly very hostile. The Abyssinian occasionally flies to a new perch (all unfortunately obscured or semi-hidden). More or less circling the Bluebelly. Obviously wanting to attack the Bluebelly but afraid to do so. Bluebelly sits in one place. Usually or always with Fluff. Does much silent Looking (Down). No PAG or preening as far as I can see. But certainly some vocalizing at more or less irregular intervals. Two long Chattering Rattles, <u>with definite Bow</u>. In Bow bird leans forward in sort of Low Oblique. Posture reminiscent of Purpur! At same time, tail is <u>spread</u>. Whole body vibrates in rhythm

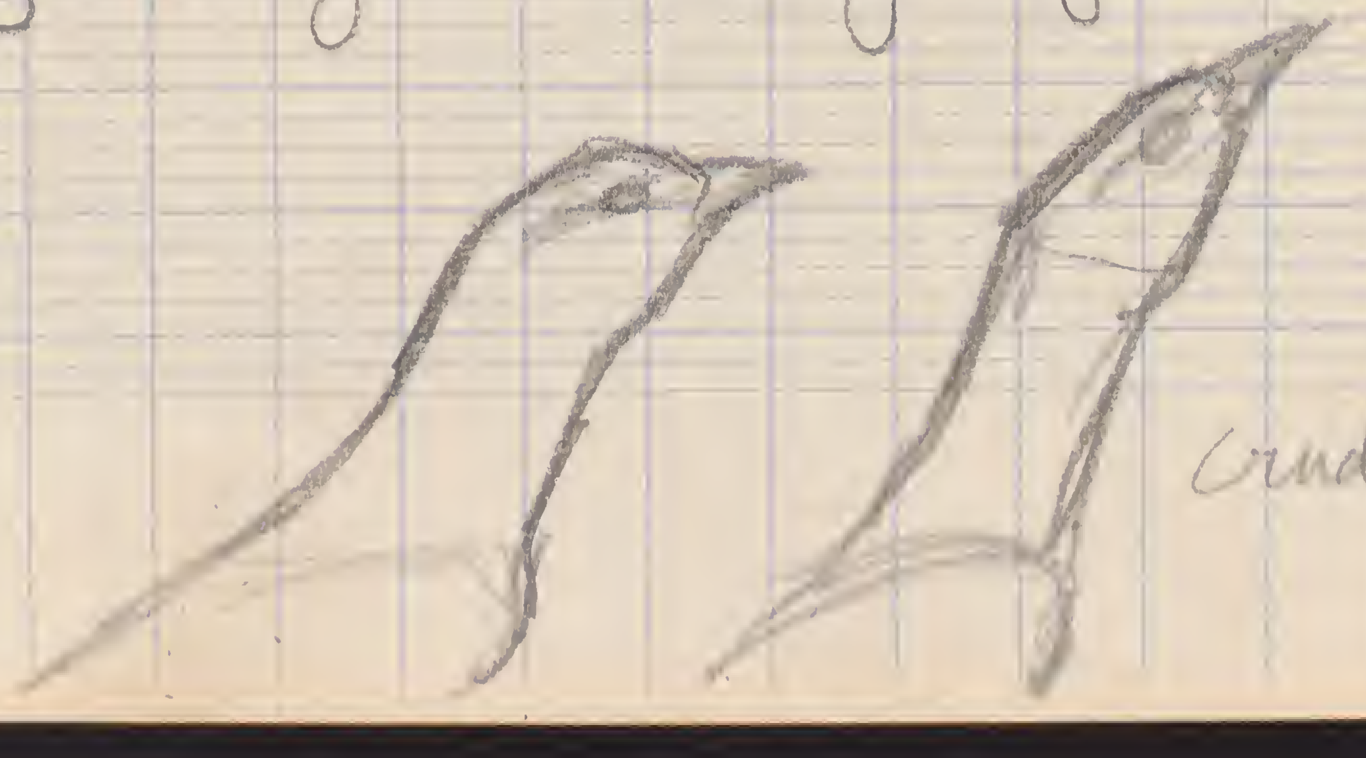
with sound. Carpal joints probably held out, but no real Wingspread. Just one downward movement each performance. Lasting throughout all or most of the Rattle. (I.E. Bowing is not repeated as during Chattering Rattles of Purpur.) Then the Bluebelly utters one Chattering Rattle without Bow. Later it utters 2 Rattle-Slurs (not together). COMMENT: some or all Rattle-Slurs may be purely hostile rather than ambivalent Song-type patterns. Perhaps Rollers do not have "Song"???

Then the Bluebelly flies off to another Kade. In Abyssinian territory but not far from usual Bluebelly border. Followed by Abyssinian. Another aerial dispute, as before, except that a (the) second Abyssinian appears and joins in. Lots of chasing and swooping, in more or less small compass, in immediate vicinity of the tree. Lots of Abyssinian "Arnh" Notes and Chatters, at least a few Bluebelly Chattering Rattles. Some of the Abyssinian Chatters or accelerated series of "Arnh" Notes are even louder than usual and very urgent sounding. Obviously very high intensity.

Then all 3 birds, the 2 Abyssinians and the 1 Bluebelly, settle in tree. Bluebelly hidden (from me). Abyssinians about 6 ft from one another. Both vocalize. One (♂?) more frequently and energetically than the other. Abyssinian vocs include lots of "Arnh" Notes, sometimes accelerated or grouped into "Chatters". (NOTE: none of the Chatters heard this morning were in distinctive Doublet, Triplet, or Quadruplet — type patterns. Perhaps the latter are partly sexual? Viz also their use in the "Rolling" aerial display!) At least once, an Abyssinian also utters "Growl". Long, rather low, r r r r r r r r r sound. Perhaps "only" a prolonged guttural variant of "Arnh". (I think that I heard a similar sound at M'Bour, but I can't remember what name I gave it.)

Bluebelly only utters occasional Chattering Rattle.

The Growl of the Abyssinian was given from a distinctive posture. A Diagonal Upright.



Crude!

I also saw this same posture assumed several times earlier in the dispute. At these times, I thought that they were accompanied by "Arnh" Notes (of a more ordinary type). I may well have been right about this.

Several of the early Diagonal Uprights were followed by another pattern that seems to be the Bowing of this species. A forward and downward "lean." More or less horizontal. In form perhaps more like the F of the Pied Kingfisher than like the (more curved) Low-Oblique of the Bluebelly or the Purpur. I can't tell if this is accompanied by sounds or not. Probably yes.

Somehow the Bluebelly gets out of this tree. Apparently goes into adjacent tree (this is also within what is, or used to be, Abyssinian territory but it is even nearer the border). And there are at least 2 other Bluebellies in the tree that this Bluebelly goes to!

When I stop observations and start to write up, 8:55 a.m., there are 3 Bluebellies, all quiet and apparently semi-relaxed, sitting close together in one tree, and two Abyssinians, 6 ft apart from one another, 20 ft away from Bluebellies in the other tree. One Abyssinian is silent. The other is still uttering "Arnh" Notes, in "alert" erect posture rather than an extreme Diagonal Upright.

COMMENTS: Obviously Abyssinians and Bluebellies are hostile to one another. Presumably Bluebelly is partly dominant (the size difference between the 2 species is very conspicuous when they are close together). But an Abyssinian can harass a Bluebelly, probably quite effectively, when a Bluebelly trespasses on its own (Abyssinian) territory. At least when and if the Bluebelly is not being too aggressive.

The behavior of the birds this morning suggests that all the local inds. of each species form a (unispecific) group. Thus the 2 Abyssinians appeared to cooperate with one another, against the trespassing Bluebelly, even though they had fought with one another earlier. (At least I assume that the inds. that cooperated were the same as the ones that had fought.) And the other Bluebellies, at least 2 of them, appeared to lend at least moral support to their fellow engaged in the dispute.

It would be interesting if the Abyssinians are just coming into breeding condition as the Bluebellies are going out.

I went to Samatit this afternoon. Saw 4 large hornbills, presumably B. fistulator on way back. More or less together flying. Mr. Santiaba. Region of rather open vegetation, low scrub and Borassa palms. 6:10 pm.

Oyonye,
November 11,
1976

Going to Ziguinchor this morning. Leave 7:40 am.

Nothing of significance before the Bac. Note: bee-eaters and perhaps some or all rollers are not active very early in the day. For obvious reasons.

8:22. Past Bac. Region mixed veg. See single Bluebelly 15 ft up in Kade semi-open area. Sits. Then group 5-6 Wood-hoopoes, Purpurs, flies in. Move around 5-20 ft from Roller. No apparent reaction between species. Purpurs utter several Rattling chatters. Move back and forth between this Kade and adjacent tree. Then one Purpur Allogrooms another. Then second Bluebelly appears. Lands some distance from first. No Greeting. Purpurs straggle off. Second Bluebelly flies to ground several times. Still no greetings on returns. Then both move on. Then Purpurs back. Move up tree trunk in regular fashion.

One Purpur apparently attacks and displaces short tailed glossy starling in same tree.

Move on 8:40 am

2:40 pm. On way back. Just outside Ziguinchor. See group 6 White faces wires edge rice field. Flycatching. Very successfully. Quite well spaced. Silent. Two of the inds look slightly dull, and seem to lack tail streamers. Juveniles?

Several inds. (presumed adults) have CR from time to time. Can't see what provokes this. Obviously low intensity.

Most of the inds do constant "balancing" tail movements. Difficult to tell if V-D or D-V. Many case, back and forth

Then we see a group of 3 more Whitefaces a few hundred yds further on (Dzibilor). Also flycatching from wires. Also well spaced & silent.

All inds. constantly looking side to side, up and down, while perched.

None pay any attention to weaverbirds perched only inches away on the same wires.

Further along road, before Nyarsia, see several more Whitefaces. All quite dispersed. Some appear to be "single" but doubtless are not really so.

Then more and more and more. Species is really dominant here now.

1:05 pm. Just before Bac. Region sedge marsh. See single Persian (definite) perched 4 ft up in bush. Definitely alone. (This is one of the few open areas in which Whitefaces seem to be absent!) Looking around in usual bee-eater fashion. Also vocalizing occasionally. Funny little "creaks" or "rattles," not very loud. "Crrrrrr" sounds. Sometimes uttered singly. Sometimes in series (up to 4). Bill opening for each full creak. Closing between creaks. No CR or other ritualized visual signals.

COMMENT: these patterns certainly were somewhat rattling in form. But it is quite conceivable that they are more (nearly) homologous with the "Bark" notes, "Auk"s, and "Crunk"s of other species than with some of the "real" Rattles and Chatters of other species. I had better continue to call them "Creak"s for the time being.

Are Persians less likely to join Whitefaces than are some of the other large bee-eaters?

More birds beyond Bac, all on wires open or semi-open areas. First 6-7 (perhaps more) Whitefaces. Semi-dispersed, 50-200 m. apart from one another. Then, beginning several thousand m. further on, 3 Abyssinians, 75-300 m. apart from one another. Then, several thousand meters further on, 2 Pied Kingfishers, close together. Then, further on, one more Abyssinian. Considerably further on, at "usual" bridge, 4 Pied Kingfishers, fairly close together. Then, approaching Ossoux, one more Abyssinian and a final Pied, several thousand meters apart from one another.

It is obvious that there is some segregation among these species. Even when inds. of the same species are dispersed, they tend to be closer to

one another than any is to birds of other species. I rather imagine that Abyssinians "discourage" bee-eaters. And Abyssinians and/or Pied Kingfishers may tend to repell one another.

Abyssinians seem to be much more likely to perch on wires, or wire poles, than are Bluebellies. Doubtless partly in correlation with their greater preference for more open habitats.

Ossouye
November 12
1976

No *Halcyon* songs audible at house very early in the morning. A fair amount of other D.C.

Going down along beginning of road to Park. Toward Bluebelly - Abyssinian area. Weather is cool with some cloud.

6:56. One Bluebelly in usual Kade in field. Silent. Apparently alone. 2 Purpures fly into same tree. One Purpur utters "Anh" Note. Purpurs land in top tree, 20 ft from Bluebelly, start to feed. Movements erratic. But more downward than upward. Then both fly off to more distant Kades.

Purpurs "checking in" with Bluebelly ???

Bluebelly just sitting hunched. Apparently ignoring nearby drongos and long tailed glossy starling.

7:05. Second Bluebelly flies in. Lands inches away from first. No Greeting. Newcomer looks small. Presumably ♀. If so, first bird is ♂. The 2 birds sit side by side. (Sketch). One flies down to ground. Back. Again no Greeting. Both sit.

7:13. See Abyssinian in distance. In usual tree. I.E. the boundaries between Bluebellies and Abyssinians have <u>not</u> changed.

Then hear 2 Rattle-Slurs followed by 2 simple (Chattering) Rattles in Bluebelly tree. There is third bird there now. Some distance from the other two. Third bird flies off. To high-stumps dead *Borassa* some distance away edge field. Utters some sort of

Rattle on landing, even though apparently alone. Then just sits.

I walk down path toward Abyssinian area. Find single bird sitting 15-18 ft up in Kade. Suddenly it lifts its head in neck in semi or low intensity Diagonal V, utters 3 brief Growls or Rattles. Each might be transcribed as "Crrrrr". (Shades of bee-eaters!). Then relaxes. Then flies down to ground. Up. Out of sight. Presumably behind intervening tree.

7:37. The 3 Bluebellies have not changed their positions.

Note: it is still relatively cold. Sun is just starting to come out.

See 4th Bluebelly sitting in Kade. Not close to any of the other birds. Also see Abyssinian in Kade across road.

I walk across road. 7:46 a.m. Hear lots of Sen Songs Coming from high tree (Fromager?) edge village. This is not far from edge of Abyssinian area - but Abyssinian is not visible or audible at the time. Then Sen shuts up.

Then more Sen Songs. Not far from cemetery. Phrase after phrase. Then Sen shuts up (again). And now I see that there is an Abyssinian in Kade in field 150 ft away.

It looks as if Sen is involved in roller microgeographical separation system here! (Note: the presumed Sen territory has lots of trees, more or less over fields and gardens. The roller territories have fewer trees.)

I suppose that local Mal(s) may also be involved in system.

Pair of Yellowbills fly overhead. Abyssinian pays no attention. Hear Yellowbill Whistle performances in tree not far away. At least 2 diff. event birds, high in different Fromagers.

Walking along path across road. See that there is a small pond not far from where Sen heard singing first.

Walk further down path. Then back. Single Abyssinian perched in Kade. Utters single "Arrrh" Notes occasionally. Then flies away.

See 3 Bluebellies in same Kade across the way. 2 close together. The third 20 ft away. This group does have 2-3-4 arrangement!

And 2 Abyssinians, 12 ft apart, in another tree (not close to Bluebellies). Apparently startled by me. Fly off. In different directions. One utters "Arrrh" Notes in flight. Lands in tree across road.

All very dull 8:22.

Two Yellowbills still in Fromager is edge village. Then move over (back) to forest. Stopping in Kades in field on way. Then flying over wide expanse of rice field.

Walking back to village 8:38 a.m.

10:10 a.m. Start out along road to Mambalang Bac. It is still semi-cloudy, relatively cool for time of day.

See 2 Abyssinians, not together, on wire poles not far from town.

No Pied Kingfishers on "canal" bridge. The tide is low now. Pied Kingfishers seem to be more active and/or concentrated when tide is high. When they seem to find it easier to get fish.

Wind is strong today.

Go on down almost to Bac itself, 10:45, without seeing anything significant. Is wind discouraging bee-eaters?

Speak of the devil! Of course! See 3 Whitefaces on wire 10:53, on way back. Several feet apart. Fly off immediately. I get out of car to look around. This is area of extensive dry sand flats, occasional small patches of grass, edge marsh. And now I see that there are 8-10 Whitefaces in neighborhood. Most of the birds are flying from spot to spot, on sand flat, apparently picking up insects from ground. Usually rather far apart (10-30 yds) from one another.

Also occasionally perch low in adjacent bushes (often but not always to shake or pound insect).

Several times, when one bird lands a few inches from another in bush, there is an outburst of Twittering by one or both inds. Once with extreme Wingspread by both inds. Usually without Spreading either.

Several times see 3 inds more or less close together in same bush. Trios? And/or families?

I do some sketching. Then bulldozers come along and disturb things. But some birds come back. Not very active.

Facial & breast pattern is quite distinctive. Seen from front, there are three parallel horizontal black stripes.

One ind. apparently catches insects as they fly by. While perched. The bird does this at least twice.

Going on 11:25 a.m. On the way back, see several more Abyssinians and Pied Flycatchers. All much as usual. Except that one of the Abyssinians is lacking streamers. (Identification definite. Ind. certainly is not a European Roller.)

COMMENT: If Lilacs really have left the region, as is beginning to seem likely, their departure may be more closely tied to the arrival of bee-eaters than to the appearance of Abyssinians.

In the afternoon, go along road to Samatit. Dropped off 4:00 p.m., at Santiaba, approximately same place 4 fistulator seen yesterday.

Hot, still, and quiet!

4:17. Region low degraded scrub and fields with scattered R palms and other trees. Single Blackbill flies by, silent and alone.

A little further on, see single Lilac perched in isolated R palm near rice fields. It flies off. A few seconds later, see single Bluebelly flying over fields not far away.

So Lilac is (still) here at least! Are there any large bee-eaters around???

See Bluebelly. It is perched 3 ft up on stump by semi-bare field (probably planted with a little manioc). Sitting silent alert. Then flies down to bare ground. Gets black insect. Beetle? Swallows it on ground. Up to another low stump. Silent throughout.

Blackbill flies by, uttering Single Whistles.

Then see single Lilac 30 ft up frond R palm. No more than 100 ft approximately from Bluebelly. Flies off to another palm. Not much further from the Bluebelly. In full view of Bluebelly, who doesn't seem to pay any attention. Lilac is out of sight now.

Then see Lilac in another R palm. Are there 2 inds of the species here? I think so.

Then a second Bluebelly lands in still another R palm. 35 ft up. 100 m from Lilac in view. Probably half way between this Lilac and the other (presumed) Lilac out of sight.

Everyone still silent. The 2 species seem to be getting on splendidly!

Lilac in view flies away 4:35 p.m.

One of the Bluebellies, the low one, is also gone for the moment.
Then see 2 birds flying around adjacent R palms. There probably are 3 inds. of the species. Flying birds utter 4-5 Note Chatters. "Ahh auh-auh-auh" — — — — These are real Chatters, not at all like Rattling sounds.
Then one lands top of dead R (all fronds gone). Looks down in to top cavity. Silent. Then over to live R. Its opponent, if it had one, seems to have gone. Now there seem to be only 2 inds. present. Each with own R, 1500 ft apart, one on each side road.
No! There is still a 3rd Bluebelly around. Perched on low R several thousand ft. from other two inds. Over rice field.
NOTE: These Bluebellies are scattered all over area in which Lilac(s) were seen earlier. But I can't see Lilacs now.
Now I see 4th Bluebelly (definite) feeding ground manioc field. All inds. are really quite far apart from one another. In quadrilateral.
Nothing much going on. So I sketch. Then walk further.
5:03. Flooded rice field marsh area. See single Mal perched 6-7 ft up in dead mangrove. Looks from side to side. Silent. Flies away.
Two (more) Blackbills fly over marsh. One utters several Single Whistles. Into trees far away.
Then single Mal flies low over marsh and flat. Disappears. Perhaps into hole in dike!!! I walk along dike. Can't find either hole or Mal. But see a pair of Pieds only 10-15 m. further on. Mal and Pied are at least adjacent here!
5:15. Hear more real Chatters back among Bluebellies. Lots of chasing back and forth. Involving at least 3 inds. Then one real Rattle. Then a lot more real Chatters. Again the 2 vocal patterns are quite distinct. Some Chatters composed of particularly loud and urgent "Auh" Notes. Sound Abyssinian-like. I approach closer. See that there are 5 inds in dispute. Flying about in all directions. Lots more 3-5 Note Chatters. Also lots of Gliding with set wings. Usually by 2 inds close together. No rise, and only gentle descent. I cannot tell if birds are always silent during glides. Perhaps some utter

Chatters when gliding as well as when flying with beating wings.

Fight gradually simmers down. Birds land. In neatly segregated fashion. 2 close together in one R palm; another 2 close together in another R palm, perhaps 200 ft away; and an apparently single ind on top dead R palm, perhaps 300 ft further away. Single ind. lands with real Rattle → real (2 note) Chatter → Slur. Then sits silent. Then flies down, clings to trunk of R, 3 ft from top. Looking into hole ???? Then flies back to top. HD silently. The other birds, each twosome in its own tree, occasionally utter real Chatters. With decreasing frequency.

It looks as if this dispute had brought the members of each pair together, both physically and morally. But I did not see anything like copulation.

Gradually birds fall silent. At about same time, the members of the "pairs" start to "scatter", dispersing several hundred ft from one another, apparently to resume feeding. From ground (dikes).

While all this was going on, there was a lot of activity by Blackbells in the neighborhood. At least 3 inds. 2 inds. land together in exactly same mangrove bush where Mal seen earlier! Lots of Single-Double performances, both in flight and when perched. Double Whistles in flight not accompanied by distinctive postures or movements. Blackbells disappear at about same time that the Bluebell dispute dies down.

Was the Blackbell activity stimulated by the Bluebell brouhaha? Is this sort of interspecific reaction common among Coraciiformes!!!! Perhaps so. I think that I have seen comparable cases among other species.

Some minutes after end of Bluebell dispute, a single Blackbell (re) appears. Flies rather low over Bluebell area. Blackbell itself is silent. One Bluebell utters brief Chatter.

Also, at the height of the Bluebell dispute, I saw a single Lilac hawking for insects 100-150 ft up. No one seemed to pay any attention.

5:50. One Bluebell on ground sandy road. Hops and flies short distance. The species is not a good walker. Looking alert. Then flies up to perch.

As usual, no one pays any attention to parrots or Criniferus in the neighborhood.

COMMENT: Walking back along road, along slightly higher ground, see much less of interest. Most of my birds here are limited to swamps and rice fields!!!

6:06 p.m. Two large Merops-type bee-eaters fly overhead. Area dry low mixed scrub. Can't identify species. Perhaps brownish above?

Back to marsh and rice fields. There is still at least one Bluebelly around 6:19. On stump. Flies to ground. Away. In fact, there are at least 4 inds. here. Several on ground in manioc field. All quiet. Only one "Auh" note when an ind. flies a little distance.

6:25. Single Purpur flies by and into adjacent R palm (same tree used by Lilac earlier). No apparent reaction by Bluebellies. Purpur is silent and alone. Preens. Then flies away.

I notice that it flies in almost hornbill-like fashion. Long stretch of flapping - brief glide - long flapping - brief glide . . . .

While I was making these observations, O. & K. went on to Samatit. On the way there, they saw one Abyssinian and one White face. Region of low scrub before the village itself. The two birds were not particularly close together. Abyssinian on wire post. Whiteface on wire itself.

Ossouye,
November 13,
1946.

Going to Ziguinchor again this morning. Weather is cloudy, cool.

8:02. Near town of Mambalang. See Bluebelly chasing and swooping at Yellowbill. Quite vigorous. Too far away to hear sounds.

Further along road, before Bac. See Abyssinians and Pieds as usual.

Also 2 Pygmy Kingfishers. First time in a long time. Not together. One on small stump in rice field. The second on wires

Ziguinchor,
November 14
1976

Driving around at mid-day Road to Koubalan etc. 1:15. There is a single Abyssinian around. Flies from tree to tree. Once definitely chases an insect in air. Hawking. Can't tell if successful or not.

Note: this is over peanut field. Area looks perfect for Bluebellies But I don't see any around.

Going out to Ossouye in afternoon. See Abyssinians, Pieds, and Whitefaces more or less as usual.

Then, 4:45 p.m., between Bac and town of Mamblang. Area huge rice fields. Find group of at least 7 Persians (definite) All more or less together. Flycatching in a particularly acrobatic style, with swoops, zigzags etc. (As spectacular as Abyssinian aerial display!) Then 6 inds. perch in Kale in middle rice field. 2" - 3' apart. Quite a lot of vocalizing while settling. With some Jabbing. Creak-type Notes "Kurrah" or "Kruh" Often repeated. Apparently not organized into definite, ~~limited~~ series. No Wingspreads at any time.

These Persians ignore weavers and pigeons in same tree.

It is interesting that they are not associated with Whitefaces (which can only be 1/4 - 1/2 mile away, at best).

Some inds. sit placidly for minutes on end between flycatching flights. Obviously less nearly constantly active than Whitefaces (or Avons).

NOTE: there do not seem to be any rollers around here at the moment. Or even kingfishers for that matter.

5:02 p.m. Now only 3 inds. left. Not close together. All preening.

We go on. Find a single Abyssinian only a few hundred meters down road. Then several more single Abyssinians. No bee-eaters near any of them.

COMMENT: Bee-eaters may conform to one general rule. They apparently do tend to be gregarious, in one way or another. And they do go in active search of their food (insofar as they are nomadic and/or have to cover enormous territories or ranges).

Remember also Williams' statement that rollers occur in flocks on migration

NOTE: K says that bees come in to visit rice flowers. Irrigated rice is supposed to flower around October 1. (Upland rice is supposed to be several weeks earlier.) This corresponds rather well with beginning of dry season and the first appearance of Abyssinians and large bee-eaters in the region.

Do bee-eaters really eat bees? Are they really "guepiers"???

Orrouye
November 15
1976

Morning is clear and cool. Going to work along road to Mambalang Bac. Arrive area mixed vegetation with some large trees near town of Mambalang 6:55 a.m.

6:59. Pair of Yellowbills fly into rather isolated tree. Silent.

Then I hear Bluebelly type Rattling Chatter from acacia several hundred yards away.

7:02. One Yellowbill (♀) just sits and preens. The other, presumably ♂, utters some series Single Whistles.

Actually there seem to be 4 Bluebellies in Acacia. Not close together. Sitting hunched. Looking down into peanut field. Then one flies closer to another. Lands 1 ft away. No Greeting.

Going on further down road.

7:25. Region mixed veg. Rather large pond nearby. See ♂ Pied perched 20 ft up in Acacia. With extreme CR. Doing repeated very extreme V-D Tail Bobs. Then it flies down. Swoops repeatedly at 2 Giant Kingfishers (♂ + ♀ I think). There is an exposed, 3-4 high, clay or mud bank here. With lots of holes (various sizes), obviously old nest holes, in it. The Giants are perched, at different times, on sloping sides of bank. As far as I can tell, the swoops by the Pied are silent. Giants react by turning to face attacker, (probably) opening bill, and doing Wingspread. Latter rather variable in form (perhaps inevitable in the rather awkward position of the birds). Giants also quite

silent at this stage. Then the Giants fly up to the Acacia in which the Pied was first seen. Land 3 ft apart. No Greeting or Landing Call. But one ind. utters single Yelps a few seconds later. Pied flies on.

Later I see that there are 2 Pieds in neighborhood. Flying around together. Pair? Uttering occasional Twitters and other sounds. Apparently ignoring Giants for the moment.

Giants sit. Then one utters medley of Yelps and Rattles. Shuts up. Then ♂ flies down to ground edge bank. Utters series of Yelps as he does so. Sits on ground. And Pied swoops at him repeatedly. At least 3-4 times. All swoops are silent (definite). None leads to actual contact. Each time ♂ Giant faces attacker, opens bill widely (Gape), silently does Wingspread (definitely ritualized). With CR throughout.

Then Pied flies on.

I lose track of birds while writing up. I think I hear Giants on other side of road 7:50

No. ♂ Giant has apparently moved. But ♀ (definite) still in Acacia. Does U-D Tailbobs as I approach. Has more or less CR throughout. (The crest of this species is so shaggy that it is difficult to tell when it is raised or not.)

The Pieds seem to be active around pond 100-150 ft away. I see that this has another bank with holes nearby) And there are 4 inds present; 3♂'s and 1♀! Mostly perched branches cut bushes edge water. Some supplanting and/or joining. Sometimes with Twitter, F, and Wingspreads. No one is using holes, as far as I can see.

♀ Giant just sits. Once utters several brief, rather soft Yelps. Sits again. Then utters more soft Yelps occasionally. Sometimes at least in apparent response to Yelps by distant bird (presumably ♂). Then, 8:10 a.m. She suddenly flies down toward bank. The near bank, not the pond bank. Utters series of Yelps as she does so. She passes out of my sight. I move to get better view of bank. To find ♀ out of sight (has she gone into hole?); but the ♂ is sitting on the ground nearby!

And he is attacked repeatedly by ♀ Pied Kingfisher. The ♀ Pied is perched 20 ft up in (another) Acacia. Swoops down on ♂ Giant

from full height. But (again) apparently without making contact. Most swoops quite silent. One accompanied "Tsit tsit tsit". ♂ Giant responds in usual way. Gape & Wingspread, probably always with CR. Then ♂ Giant flies off. So does ♀ Pied.

Apparently ♀ Giant was not in hole. A few minutes later, both birds seem to fly back into area. Both uttering both Yelps and Rattles. Land in trees 30ft apart. Fall silent. ♂ in tree nearest me. Apparently nervous of my presence. Has more or less CR. Occasionally utters series of rather soft Yelps. Doublets, Triplets, and Quadruplets. These give the impression that they might be "Alarm Calls". Then ♀ flies down. Sits on bank. ♂ still in tree. Note: as far as I can tell, he has nothing in his bill at this stage. Nor does the ♀.

♂ flies down to ground also. Utters rather long series of Yelps as he does so. (This Yelping when going to ground is perhaps reminiscent of Sex) Lands 4 ft from ♀. Sits silently.

Then ♂ flies up to bank, puts head and breast into hole briefly. Out immediately. Lands on ground. Again not particularly close to ♀. Sits. Utters occasional Doublet, Triplet, Quadruplet soft Yelps. Again these suggest Alarm. Now ♂ has crest very definitely smoothed down, very smooth. And at first he seems to have something in bill. Mud? This disappears, somehow, after a few minutes.

Are these Giants in the nest excavation phase ???

♀ eventually flies up into nearby Acacia tree. This is tree from which ♀ Pied launched attack earlier. It is also tree in which there are 2 Abyssinians now. SEE BELOW.

♀ Giant just sits quietly in her tree. ♂ Giant continues quietly on ground. Then ♂ changes position, lands on ground a few feet from first site. When he moves, ♀ Giant utters Rattle → 4 Yelps. This sequence is rather reminiscent of Rattle-flier performances of Bluebellies.

Then a Pied appears (sex not identified). Flies around, ca. 15-20 ft up. Utters "Tseet" Notes. (Are these particularly aggressive?) Lands in tree above ♀ Giant. Then swoops at ♀ Giant. Swoop silent as usual. ♀ Giant Gapes and Wingspreads

All three kingfishers fly off in the next few minutes ca. 8:50. I walk forward. There is a small milky green pond near base of the bank here. I shall call this small body of water "the Giant pond", in contrast to the larger body near here which I shall call "the Pied pond".

Then I retreat out of sight, back to car on road, as I am afraid that I may be discouraging the birds.

The Giants are back in general area ca 9:00 a.m. Land in trees across road. One of them utters several loud Yelps followed by Rattle on landing. This is not Bluebelly-like!

Perhaps there is no stereotyped combination of Rattles and Yelps in this species.

The "Yelp" may be the "Basic Note" of the species. Obviously homologous with "Ack"s and "Arrh"s of other Coraciiformes. But perhaps quite variable. Perhaps I will have to distinguish several different categories of Yelps eventually.

Giants back once again a few minutes later. One of them utters Rattles and loud Yelps, with Wingspread, when approached by Pied Crow, who supplants it ("accidentally"?) on perch. Then flies on with more Yelps.

ADDITION: while ♀ Giant was perched above ♂ Giant earlier, she did several up-down Tailbobs. Also several slight Headbobs (quite Pygmy-like!). Tailbobs and Headbobs not coordinated. All with more or less CR, I think.

COMMENT: Obviously the territories or ranges of the Pied and the Giant are at least broadly overlapping here (and everywhere that the Giant occurs?) And obviously the relations between the 2 species are actively unfriendly. And it is the Pied that is the more aggressive of the two.

The Pied seems to be able to combine high levels of aggression and high levels of gregariousness. This should mean that its food is more abundant, perhaps more often concentrated, than is that of other species of kingfishers.

The Giants are still around 9:25 a.m., but I will move on.

ADDITIONS: During most of the time that I was watching the

grants, there were 2 Abyssinians in one of the Acacias near (behind) the Grant pond. I presume always the same 2 inds. They were very active and noisy, but I could not watch them continuously. I did, however, notice the following patterns:

At "first", there was only one ind. I saw it finishing an aerial display, at least Soar (set wings) and Glide (rocking side to side with loud, urgent, accelerated "Arrh" Notes). This ind. lands at very top of tree, ca 30-35 ft up. Note: the top branches of this tree are all bare. It is the bare branches that are used by the rollers. Middle and lower branches are well-leafed. It is the leafy parts that are used by the kingfishers.

Then another ind. flies in. Lots of "Arrh" Notes. Also Growl notes (possibly intergrading with typical "Arrh"s) in Diagonal Uprights By newcomer, I think

The birds alternate periods of apparent calm, sometimes with preening, with periods of moving about and vocalization. They range from 2 to 10 ft apart. They always or almost always do conspicuous slow Tailraise on alighting. I think that the Raises tend to be relatively exaggerated in these circumstances. More conspicuous than when performed by a bird "alone". This suggests that the Tailraise is positively hostile.

There seems to be a tendency to face away from "partner" when doing a Tailraise. Almost as if displaying under-tailcoverts. As far as I could tell, there was never any wing drooping or display of dark blue lower back and rump

Later on, there was another aerial display by one of the birds. Starting from Acacia and returning to same tree, almost precisely same perch. Usual form. Soar definitely with set wings. No real somersault before downward plunge. Beginning of downward plunge also with set wings, but wings are beaten toward the end

Obviously these 2 birds were strongly hostile to one another, but they certainly stayed together for long periods and presumably returned to one another. It all looked very much like the first stages of "courtship".

The Abyssinians seemed to ignore and be ignored by the kingfishers in the same tree.

Neither species of Kingfisher nor the Abyssinians seemed to pay any attention to the vocs. of Yellowbills, Blackbills, or even Bluebellies, all of which were audible and conspicuous not far away.

Back to same area 3:05 p.m. Hot!!!

Only bird of interest visible is single Pied perched on brushy water, with bill open, wings semi-spread, obviously as hot as I am.

3:09. Hear doublet soft Yelps of Giants. Then loud Yelps followed by Rattle. And one Giant lands on ground in more or less usual place.

Actually both ♂ and ♀ are on ground. ♂ nearer "nest" hole. Both inds. gaping from heat. Look nervous (of me?) ♀ flies away. ♂ follows a few seconds later.

Then see single Lilac hawking for insects 30-40 ft up over Pied pond. Lands 30 ft up distant acacia. At same time hear several not-very-loud but very twangy "Arnk" Notes. By this Lilac? Or by another ind. of the same species.

Also hear several single soft Yelps not far away. Obviously the Giants are still in the neighborhood.

3:19. Can't see Lilac now. But 2 Whitefaces come and land 50 ft up dead branches of the same acacia in which the Lilac was perched. No visible Greeting (the inds. are too far away to hear).

I can, however, hear Pied Twitters in distance.

The Pieds shut up. And then I hear one Fen Song!

Now there are 2 ♂ and 1 ♀ Pied on brush. Intent. Occasionally change perches. Some brief Twitters. Some Shaking on landing.

See ♀ Giant 12 ft up in dense foliage of tree between ponds. The Giants are really sticking very close here now! ♂ utters Yelps out of sight. ♀ answers with several series 3-4 Yelps → Rattles. Yelps rather loud. Pronounced V-D Tailbob with first Yelps each series.

NOTE: there is a very large pond just across road.

I imagine that all these ponds must be at least semi-fresh (not salt, although perhaps rather stagnant).

3:39 p.m. Things rather dull now. Giants still audible from time to time but mostly out of sight.

Take a small walk. Come back 3:50. To find both Giants on ground usual area. ♂ flies up with a few not very loud Yelps. Flies straight into hole in bank. Disappears completely inside. And I can see little showers of dirt coming out! ♂ flies out after 15-30 secs. Lands beside ♀. Utters a few Yelps as he comes down. No (other) Greeting. Both birds sit. Both with bills open. ♂ with CR. ♀ with crest smooth. Then both fly off. I am afraid that they are afraid of me.

As far as I can tell from here, the hole chosen by the ♂ is about 1½-2 ft above surface of the water. It looks like an old hole being re-excavated. (This bank, like the one belonging to the Pieds, is full of old holes. I have seen other banks with old holes around here. The area must be littered with hundreds of old nesting sites. I suppose that some of them must be used again & again.)

Go back to road. From there see ♂ Giant on ground. From time to time flies from one side of pond to the other. Usually uttering several soft Yelps as he does so. Obviously reluctant to enter hole while observed (and it is unfortunate that there are small children around here now). I have to walk off again.

4:10. Hear Yellowbills in distance.

Down road a little, see 3 Purpures fly across road. With usual Rattling Chatter.

Back to Giant area 4:30 p.m. The birds seem to have gone. I hope only for the time being.

Even the Pied seem to have gone. Was everyone retired early???

I will start to walk back along road to Onoure 4:40 pm.

5:05 pm. Walking through R. palm plantation. What looks like a woodhoopoe flies by. Silent & alone. With wing stripe(s). But as far as I can tell, no white in tail. Is this juv. of the common species?

5:13. See Bluebell in very great distance. Flying diagonally upward ca. 100 ft above ground. Then diagonally downward. Lands top of very tall tree, perhaps 80 ft up. Was this aerial display?

A few minutes later, see a single Bluebell, much nearer, apparently hawking for insects 15-20 ft up over scrubby grassy field.

(This is very close to where Yellowbills watched this morning). Bird eventually lands in small tree where there are already 2 other Bluebellies perched. Lands 10 ft from others, who are about 6 ft from one another.

Then a group of 8 Fistulators appears flying (probably from forest) from distant horizon. Ca. 30 ft up. 5-20 m. apart. No particular flight formation. Occasionally utter brief nasal Chatters (sound quite like abbreviated muffled versions of Bluebelly Rattling Chatters). One of the Fistulators lands in same tree as Bluebellies. About 4 ft from 2 of the Bluebellies. It just looks at them. Bill slightly open, presumably because of heat. Bluebellies just look back. Fistulator flies off after its companions.

Even though there was no interspecific display, this encounter probably was not "accidental." It looked as if the Fistulator was definitely "inspecting" the Bluebellies.

Fistulators disappear over far horizon. Bluebellies start to feed from ground in usual manner. Generally silent. But I do hear one Rattle Slur.

Then Blackbill flies by. Uttering single Whistles. Lands in tree between Bluebelly tree and the tree in which Yellowbills were seen this morning. Silent after landing. The Bluebellies don't seem to pay any attention.

COMMENT: Yellowbills, Blackbills, and Fistulators certainly overlap in this region. Usually kept from actual contact by a system of social segregation.

A few minutes later, Yellowbills call briefly in distance. Still no more sounds from Blackbill.

A little further on, see single Abyssinian perched 50 ft up in tall tree edge Onomuze rice fields. Silent and apparently alone.

5:43. Much further on, another single Abyssinian on wire past over rice fields.

I can hear some Pieds out in the marsh. Mostly Twitters. Still fishing here at 5:48. Hovering and diving. Tide seems to be high.

Yet another Abyssinian on wire over rice fields.

Arrive back town 6:00 pm

Osonye,
November 16,
1976

Going to try Giant area again this morning. Arrive 6:45 am. Clear and cool. Miscellaneous DC.

No kingfishers of any sort around at first.

Then a whole host of Giant Yelps (Cont.) 6:51.

Immediately after, hear several "Arrh" Notes. See Abyssinian perched top same tree as yesterday.

Damn! Look up to see Giant copulation in process! ♂ on back ♀. Waving wings for balance. Then one bird utters several loud Yelps. Both fly off. ♂ down toward bank with more Yelps. ♀ to distant Acacia. Perches 20 ft up. Utters Rattle. ♂ disappears. ♀ shuts up.

♂ back, lands on ground with Yelps. ♀ utters Rattle-Yelps as "Greeting"? ♂ apparently goes off again. ♀ sits quietly. Probably with some CR.

There are now 2 Abyssinians in tree. Sitting quietly 3 ft apart. Ignore and are ignored by ♀ Giant 25 ft below them.

♂ Giant back. Lands on ground. Utters loud Yelps as he comes in. ♀, still in tree, utters Yelps - Rattle - Yelps - Rattle - Yelps. Then ♀ flies down to ground. Uttering a few Yelps as she does so. Sits 6 ft from ♂. She is silent. Crest semi-down. Only rear plume visible (as in my drawing, lower sketch). ♂ semi-invisible. But he occasionally utters brief series soft Yelps. And he makes 4 visits to breeding hole. Same hole as yesterday afternoon. Sometimes puts head and shoulders in. Sometimes whole body. Usually utters a few soft Yelps as he flies to hole. I do not see any dirt coming out. Once ♂ sits on ridge between visits. Silent. And he has crest down, completely smooth, not even rear plume is visible. ♂ flies off. ♀ remains. Sitting silently with semi-CR.

7:05. Single Pied flies around area. Uttering "Tseet" Notes. But flies off without attacking.

♂ Giant back. ♀ flies to tree. ♂ follows, starts to land near her. Lots of Yelps and Rattles by one or, more probably, both

birds. Then ♂ (frightened by me?) turns and flies away. ♀ remains behind. Then also disappears. Silently.

No! She is still here. I hear Yelps and Rattles from distant acacia. See ♀ perched 30 ft up. Also answering Yelps from nearby acacia. ♀ does silent Wingspread when Abyssinian flies in to land 10-15 ft away. Abyssinian silent. Lands with extreme Tailraise. Has very large beetle or cockroach in bill, which it proceeds to shake and swallow.

Another (?) Abyssinian flies off in vigorous chase of small grey hawk. With accelerations and semi-swoops. And lots of long "Wrah" Notes. Quite harsh, but not really growling. And no trace of aerial display.

The two Giants are in the 2 different acacias, approx. 100 ft apart. Occasionally "call" back and forth with brief series (Doublets - Triplets - Quadruplets) of soft Yelps.

Then ♂ flies down to ground with loud Yelps. ♀ also flies down, lands 10 ft away. Lots of loud Yelps and Rattles by one or both birds. Then both sit quietly. ♀ semi-CR. ♂ crest smooth.

Then a francolin appears 20 ft away. Noisy. Apparently disturbs Giants. Especially ♀. She utters a few soft Yelps. Flies over to land 1 ft from ♂. He may utter soft Yelps as she comes in. She does pronounced U-D Tailbob immediately after landing. Both sit silently. Both with only trace CR.

Things settle down to a routine from approximately 4:30 to 4:50.

Both Giants stay on ground most of the time. Ranging from 1 ft to 8 ft apart. Silent most of the time, with little or no CR.

Every once in a while, one of the birds will begin to utter short series of more or less soft Yelps. This usually or always induces partner to utter similar series of soft Yelps in return. Doublet Yelps are very reminiscent of "Bisyllabic Notes." Doubtless illustrate the origin of the Bisyllabic patterns of such species as the Pied. But not very well segregated as a separate display in the Pied. Short series of soft Yelps may function as "contact patterns." This is most obvious, or "apparent," when the 2 birds are far apart, as when they are in different trees. The function is less obvious in

the present circumstances, when the birds are close together. Hear and now, the series of soft Yelps seem to be primarily "flight int. movs."! Usually or always, the soft Yelps are followed by a bird flying up, to change position and/or to make an inhibited or aborted, or real and successful, visit to the breeding hole. And each time the bird flies up, it utters a series of louder and more urgent sounding Yelps (seldom or, more probably, never with any Rattles). The inhibited approaches are when a bird flies toward the breeding hole but then swerves at the last moment and lands on ground or ridge outside instead. The real approaches are when a bird goes so far as to put its head and bill inside the hole.

It is characteristic now that the ♀ is visiting the hole, or starting to approach it, more frequently than the ♂! She makes at least 4 "visits", 2 successful and 2 aborted. I do not see any earth fly during the successful visits. Is the ♀'s motivation changing? (And/or is she more likely to visit because she is "defending" against the francolin???) The ♂ makes only 2 "visits" during this period. Both aborting, I think.

The birds also utter loud Yelps when rejoining a partner after making a visit to the breeding hole. At least once, the Yelps are associated with at least one Rattle.

But there is never any Wingspread in these circumstances.

It is noticeable, however, that both ♂ and ♀ tend to do one or more conspicuous V-D Tailbobs immediately after landing.

I do not see any Headbobs. If they occur, they must be slight.

Ca. 7:40, a single Pied appears. This is a ♂ (definite). Flies around, more or less circular path, over Giant pond. Uttering "Tsuit" Notes (as usual). But it does not attack. Lands 15 ft up in small tree, about 15 ft. up, perhaps 20 ft from the Giants. Silent on landing. Has extreme CR. Does several extreme V-D Tailbobs. Then flies away.

At 7:50, the 2 Giants fly away. Into trees beyond Pied pond. Some flying back and forth. Lots of loud Yelps and some Rattles. Several sequences of Yelps - Rattles - Yelps. Then they disappear. Apparently they have gone off to mangrove marsh several thousand m. away. Presumably to feed.

I leave 8:00 a.m.

GIANT

Miscellaneous Notes & Comments; Partial Summary.

① The social organization of the species seems to be simple. Inds. are found as singles or pairs (and presumably families, at the right time of year). None of the peculiar "groups" and/or polygamous associations of Pied Kingfishers or Bluebellies.

② Not surprisingly, the display behavior of the species is also simple. Apparently includes only two kinds of vocalizations: Yelps (variable, but with the extremes intergrading), and Rattles (much less variable in form). Plus a few visual displays: Wingspread, CR (of several intensities and with a possibly distinct "Crown-smoothing", CS), Tailbobs, and Headbobs.

③ The species does not seem to have any distinctive "aerial display".

④ Nor does it seem to have any "Song".

⑤ Nor does it seem to have any distinctive, stereotyped, separate "Greeting" as such. Loud Yelps & Rattles may be functionally equivalent; but they seem to be combined and multiplied in variable and flexible ways. Tailbobbing may tend to occur in "Greeting" circumstances, but it is obviously nothing more than a flight int. mov. The Wingspread of the species seems to be purely hostile.

⑥ Some (soft) Yelps must be lower intensity than any Rattles. Other (loud) Yelps must be high intensity. I assume that high intensity Yelps are less aggressive than Rattles, but I have little or nothing in the way of direct evidence to that effect.

⑦ Yelps may well be essentially hostile in motivation, but, as noted above, they may (also) function as contact notes and/or signals of an intention to fly.

⑧ The basic components of the Giant repertory probably are strictly homologous with the basic components of the Pied repertory, although (even though) more easily distinguished. There also is an apparent convergence or parallelism with the Sen in some characters (the Yelp & Rattle of the Giant being reminiscent of the Chatters and Rattle of the Sen).

⑨ Ceryle s.l. sp. may be distinguished from Halcyon kingfishers only by the lack of special "Songs" and "Greetings." The lack or absence

may be "primitive", viz *Coracias*

(10) The sexual behavior of the Giant probably is both straightforward and "straight".

Whatever happened immediately before the copulation this morning, it was probably simple and certainly silent.

(11) As usual (?) in Coraciiformes, the ♂ Giant seems to take the initiative in (at least) the first stages of "nest excavation".

ADDITIONS:

As far as I could tell, there was never more than one Abyssinian present in the area this morning. The "courtship" behavior seen yesterday does not seem to have been (immediately successful). Probably not coincidentally, the single bird present today had left before 8:00 a.m.

3-4 Purpures appeared near the Pied pond ca 7:40. They seemed to ignore, and to be ignored by, the Pieds and the Giants who were not far away at the time. I suppose that kingfishers and wood-hoopoes must be almost irrelevant to one another.

Ossonye
November 17,
1976

Going to try the same place, again, briefly, this morning. Arrive 6:43 a.m. Just getting light. Miscellaneous D.C.

Abyssinian comes in, silently, to usual perch before 6:54. Then utters 3 single "Arrh" Notes. Silent again sitting in quite unritualized position. This species may have even less "Song" than does the Bluebelly!

Abyssinian utters 3 more "Arrh" Notes, in semi-Diagonal-Upright 7:06. Then relapses silently again.

First Pied seen 7:10. Utters several "Tseet" Notes. Lands 12 ft up in R palm (!) near Pied pond.

7:12 a.m. Suddenly look up to see 2 Abyssinians, 2 ft apart, high in usual tree. And a single Fistulator only 6 ft from them!

Hornbill probably 75 ft up. Both the second Abyssinian and the Fistulator must have arrived silently. All 3 birds continue to be silent. One Abyssinian preens. The other sits, looks down, BW's several times. Moves to another perch a few inches away. Lands with Tail raise. The Fistulator gnaws at rather narrow dead branch and BW's. Both repeatedly. Once with trace CR. Continues gnawing & BW. No CR. Then utters the Rattling Chatter. Like a deep hoarse version of the Rattling Chatter of the Bluebelly. Quite prolonged. Then the hornbill flies away.

It is beginning to look as if these Fistulators have a definite "interest" in Coracias-type Rollers.

7:20 a.m. The two Giant Kingfishers suddenly appear. Flying in from general direction of mangrove swamp. ♀ in front. ♂ about 5-10 ft behind Very noisy. A medley of loud Yelps and Rattles. As they pass by the Abyssinian tree, one of the Abyssinians flies down, chases, and swoops at the ♀ Giant. I can't tell if the Abyssinian vocalizes or not (It probably utters "Arrrh" Notes – see below). The two Giants land in the near Acacia. About 3 ft apart. Abyssinian pursues attack until almost the moment that ♀ Giant lands. She does Wingspread, probably with CR, and continuing vocs. at landing. Wingspread probably induced by Abyssinian attack. Abyssinian breaks off. Flies back to perch. No aerial display as far as I can see.

The 2 Giants continue vocalizing (mostly Yelps I think) for some seconds after landing. Then sit quietly. Unritualized postures except for trace of CR. Then more vocalizations. Beginning with soft Yelps (by ♂?) and continuing with loud Yelps and Rattles by both birds. Then ♂ flies away, lands on new perch a few feet farther away from ♀. Medley of calls continues for a few seconds. Then stops.

I was watching the ♀ during this outburst of vocs. Tail flicked (upward?) slightly with each Yelp. And whole body vibrates with Rattles.

ADDITION: I forgot to mention that both Giants did several pronounced V-D Tailbobs immediately after landing. These Bobs are more extreme than the minor flicks with Yelps

As far as I can tell, there is no shaking at any time.

The two birds continue to sit. My view of them is not awfully clear, but I think that both of them have slight CR all or most of the time. Both inds. also do a few more, single Tailbobs (less frequently than immediately after landing)

Then there is another long and loud outburst of vocs. I can't tell which ind. begins performance, but both certainly participate. Again lots of loud Yelps and Rattles. The vocs of the ♀, at least, show a slight and variable tendency to break up into phrases (Doubtless she has to "catch her breath," or rebuild her motivation, from time to time.) Usually 3-4 Yelps → Rattle and 3-4 Yelps → Rattle → 3-4 Yelps. Then the ♀ stops Rattling and her Yelps accelerate. Settle into a Doublet and/or Bisyllabic note rhythm. Almost "Tuck-a-tuck-a-tuck-a-tuck....." I think that the ♂ stops calling at this time. Suddenly, while she is still Doublet-ing, he flies to her. Lands straight on her back, I think (or perhaps lands beside her and then hops onto her back without a moment's hesitation). She squats up. Assumes semi-hunched posture. (This does not look very ritualized per se. He grasps her nape with his bill and starts to beat his wings. (Grasping nape does seem to be a characteristic Coraciiform pattern!) Also lowers his tail several times. I think that the ♀ does not raise hers, or does so only partially. In any case, the cop. is probably unsuccessful. Both birds suddenly fly off. Probably with a few low intensity Yelps as they go. (Otherwise the cop. attempt itself was quite silent.) ♂ flies away (to marsh?) ♀ flies over to other acacia. Sits silently with some CR, 25 ft away.

COMMENT: the patterns associated with this cop. were certainly somewhat different from the ones associated with the cop. yesterday morning. The preliminary vocs. today may have been an indication that relations between the 2 birds are not (yet) entirely easy. And/or they may have been responses (slight "sit. movs") to the distance between them.

The ♀ Giant sits for some minutes. Then she is swooped at by a Pied (sex unidentified). Pied probably silent during swoop. ♀ Giant responds by silent Wingspread. One of the Abyssinians utters

several "Arub" Notes during the Pied-Giant hostilities apparently in response to the hostilities.

I start back to car 7:32 a.m. As I go, I see that one of the Abyssinians has come down off its high perch and has started to swoop at the (still perched) ♂ Giant. Does at least 2 swoops. While this is going on, the other Abyssinian, presumably the mate of the attacking bird, sits on its own perch and Growls. The ♂ Giant eventually flies away. Disappears. The attacking Abyssinian flies back toward its presumed mate. Lands 6 ft away. No Greeting. Both Abyssinians sit quietly.

It would appear that Giant Kingfishers are disliked by several other species of Coraciiformes. I wonder why???

Coming into Ziguinchor later in the morning. Waiting for Mambalang Bac ca. 8:35 a.m. See and hear a single Mal performing conventional aerial display over mangrove swamp edge marigot. (Still) in breeding condition?

On way back in afternoon 3:01 p.m. Region of sedge marsh before Mambalang Bac. Come across group of 15+ Persians. Mostly on wires. Many flycatching flights. As usual, many flights are obviously successful. Lots of thin, tinny, almost whistling Vocals. Uttered singly or in short series. I could not detect any particularly stereotyped arrangement in doublets. The various inds. were never very close together on wires. Ranging from 1½ ft to 20 ft apart. Sometimes Vocalizing when one ind. landed not too far away from another. This could, I suppose, be considered "Greeting" of a sort. Absolutely, no trace of Wing-spreading.

Lots of birds Vocalizing more or less simultaneously may give the effect of Twittering.

One ind. lands on patch of pure sand. Spreads wings and fluffs or ruffles plumage. Either sand or sun-bathing.

No Mal Songs at Bac this time.

Past the Bac we see a few rather scattered Whitefaces. More evidence that Whitefaces and Persians do not associate with one another.

Then more Abyssinians and Pieds as usual

Ossouye
November 18
1976

Going to work same place again this morning.
Arrive 6:50 a.m. Still very dark. Heavy cloud. (There is even lightning in direction of Ziguinchor.
Hear Mal Songs in distance. With multiple Intro Notes. Otherwise not much in the way of D.C.
7:01 Hear more Mal Songs in distance. In different direction. Presumably a different individual. This species would appear to be encouraged by the prospect of rain!
7:09. Hear Purpur or Bluebelly Rattling Chatter in distance.
7:25. Two Fistulators fly in. Land 40 ft up top of partly dead tree, on other side of Pied pond, where Lilac was seen a few days ago. Land together, sit side by side, actually touching one another, facing in same direction. I.E. they are contact animals. Apparently one or both inds utter(s) rather soft "Arnk" Notes when coming in and after landing. Essentially single, but repeated irregularly. Tone of the "Arnk"s is very much like that of the Chatter of the species. The two inds. differ appreciably in size. Smaller ind. seems to have a lighter bill. This may well be a pair, ♂ and ♀.
When the Fistulators come in, there are already several egrets and short-tailed glossy starlings in same tree. They seem to ignore and to be ignored by the hornbills. Then the ♂ Giant Kingfisher appears. Flying. Goes straight toward tree. Utters 5-6 loud Yelps in flight. No Rattles. Lands silently, about 4 feet from the hornbills, below and to one side. Sits.
This situation lasts for several minutes. Nothing very spectacular happens, but I get the distinct impression that the ♂ Giant and the hornbills are paying close attention to one another, eyeing one another warily. ♂ Giant sits with definite CR. The 2 hornbills sit alertly. Head and neck quite erect. Crests quite visible, but I don't know the species well enough to tell if they are purposely raised or not. Both hornbills do a lot of looking from side to side. This looks almost like repeated HF. Presumed ♀ also makes occasional

sideways preening movements. Brief and perhaps incomplete. She also turns or even leans toward the ♂ from time to time. This looks like an int. mov. of Allopreening his head and neck feathers! One or both inds. probably utter(s) a few more single "Arrh"s. All quite soft and muffled.

Then the 2 Fistulators fly away. ♂ first; ♀ following 4-6 ft behind. More soft "Arrh" notes in flight.

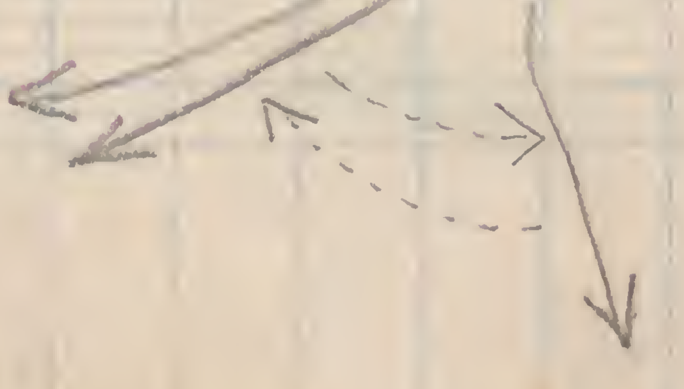
The two birds land in distant R. palm. Not close together this time. At least 4 ft apart. As far as I can tell, they just sit. Apparently do not react to a pair of Yellowbills flying, silently, several hundred meters away. A few minutes later, however, they fly off themselves — in the same general direction followed by the Yellowbills.

COMMENT: I am beginning to think that the signal behavior of Fistulators may be surprisingly roller- (or woodhoopoe-) like.

The ♂ Giant remains sitting in his tree, more or less as before. Then another Giant (♀?) flies by. Quite silently. The ♂ flies off and follows. Also silently. Both birds disappear in distance.

Rain starts ca. 7:30. At first very light. Gradually getting heavier.

No more birds appear for a long time. I start for my car 7:55. And then I see that an Abyssinian has landed on usual tree and perch. I did not notice the approach. It must have been inconspicuous. But now the bird is displaying. Sitting in more or less normal posture, more or less erect (but far from Diagonal Upright). Uttering "Arrh" Note after "Arrh" Note. In more or less regular rhythm, each note at interval of several seconds — — — — — —
This is combined with conspicuous and obviously ritualized "Tail-swinging." Tail moved up and back, then forward and down, up and back, forward and down, etc, etc. Angles commonly ca.:



The movements are partly, but only partly, correlated with the notes. When the movement coincides, the tail goes

forward and down as a note is uttered. But coincidences are perhaps less frequent than non-coincidences. Movements seem to be more rapid, more frequent, than notes. Thus there is every possible combination at some time or another. The bird continues this behavior for several minutes. Then begins to utter notes at irregular, longer intervals. Tail movements decrease in amplitude. Calling stops. Tail movements continue, in reduced form, for some seconds. Then stop also.

I suppose that series of "Arnk" Notes are the nearest thing to "Song" that the species has.

The Abyssinian is sitting quietly by the time I leave at 8:02 a.m.

The Giants have not come back. And, as far as I can tell, the Pied Kingfishers have not showed up at all this morning! They would appear to have been discouraged by the weather.

Lots of rain (sic!) later in the morning. Rain stops around mid-day, but cloud remains.

Go out along road to Sawatit and Elukine in afternoon. Arrive area just before Santrabe, where 3 Bluebellies etc. seen last week 3:35 p.m. Everything seems very quiet. No rollers immediately visible or audible.

Go on to small mangrove marsh. 3 Pieds flying with Twitters. One ind (♀?) lands high in R palm. 30 ft up. Utters "Tsel" Notes. Flies off.

Then see a Pygmy perched 1 ft up in rushes edge channel of rice fields. Does a lot of Headbobbing. Flies off when people approach.

Walk along ridge between fields. See pair of Pieds. Definitely 1 ♂ and 1 ♀. Quiet. No! Correction. There are 2 ♂'s and 1 ♀.

Rain starts again 3:55.

Well! Well! The 3 Pieds have been quite active. Perched on dike and low stumps 1-2 ft above water of rice field. Fishing quite actively. Mostly plunges from (low) perches. Some hovering. Probably not very successful. Almost entirely silent. But all inds usually with at least a trace of CR. Then, 4:05, I see that a single Mal has appeared. Perched 3-4 ft up on stump 10-15 ft from nearest Pied. Silent.

Sitting rather fluffed and hunched. Quite probably as a reaction to rain. (No trace CR). The Pieds do not seem to pay any attention. But suddenly the Mal flies over and supplants one of the ♂ Pieds on its low (4 ft) perch. Supplant looks quite probably hostile. But certainly silent. ♂ Pied flies off, with a sort of "squawk". Lands 6 ft away. Sits. Mal also sits. But does 2 V-D Tailbobs immediately after landing. And lots of single, small, but quite definite Wingflicks With Tailbobs and for some seconds afterwards. Obviously ritualized. Probably related to Shaking of Pied, but rather different in form. Then Mal just sits quiet and immobile. ♀ Pied flies over and perches on the old (previous) perch vacated by Mal. All 4 birds sit. Then Mal flies away. Disappears. Pieds continue as before.

So Mal can be dominant over Pied in some cases.

It seems likely that these Pieds are not in advanced breeding condition or mood.

Presumably these rice fields, although adjacent to mangrove, are themselves (largely) fresh water. Does Mal feed here too?

4:20. See single Mal flying over low sparse mangrove. About 30 ft from the 3 Pieds. Lands on bare branch 4 ft up. Sits silently.

Rain gets heavier for a while. The birds continue as before. Mal still just sitting 4:35. Pieds still fishing. Mostly around outlets of 2 pipes running from one (higher) rice field to another (lower field). There also seems to be a large animal in water here. Mongoose? But the Pieds do not seem to pay any attention to it. The Pieds are behaving in usual way of the species. Usual voc. form CR, Tailbobs, etc. But not usually anything very high intensity.

Once one ind. supplants another with definite Rattle.

Once one ind. utters high thin Trill with F and Wingspread when another ind. lands close by.

Now, 4:40, rain is somewhat less. And Mal seems to have gone.

One Pied chases another with definite Rattle.

Rattle and Trill seem to be variants of the same pattern or complex of patterns

4:43 pm. Suddenly 2 more Pieds appear in the neighborhood. At least one of the newcomers is ♀. They land on same perches and dike used by the others. There is some general confusion, flying from perch to perch, possibly supplants, with Twitter-Rattles, CR, F. But no Wings pumps or Trills. And the birds quickly settle down. Sit quietly. All more or less close together. This species is gregarious!

Walk back toward road 4:50.

Hear Blackbill single-double performances in distance.

See a single bee-eater on wire. Apparently Persian. Flies out over marsh. Silent. Apparently alone.

5:25. Stretch of higher ground. See 4 Fistulators flying at almost exact same spot where O & K saw 4 inds. of the same species some days ago. Presumably same group. Presumably long sustained. The 4 inds land on fronds R palm edge field. Not particularly close together. Then fly on. Disappear over horizon.

Leaving 5:30 pm.

Ossouye
November 17
1976

Going to try Giant area again this morning. It rained last night but it seems to be clearing by 6:15 am.

Arrive 6:48 am. Not much bird sound.

O Will try to photo

Abyssinian flies in to usual perch 6:54. Lands silently, with Tail-raise. Sits. Looking around. Silent. No Tailswinging.

6:57. Abyssinian utters 4 "Arrah" Notes. Indefinite but not very extreme Diag. U, and definite Tailswinging. Then relaxes again. This pattern is "Song."

6:58. Single Giant (♂?) in tree across Pied pond. Came in silently. Sits silently. Some CR.

A few seconds later, another (second) Abyssinian flies in. Lands 4 ft from Giant. Silent. Then flies nearer, lands only 2 ft from Giant. The 2 birds look at one another. Both silent. Giant with extreme CR. Abyssinian in silent Diagonal Upright.

Then Abyssinian by Giant flies over toward the first Abyssinian. Silent in flight. First Abyssinian utters "Arrh" Notes in Diag U with slight Tailswinging as second comes in. Then goes into (one) silent "Bow" (HB or LO) just as second lands 3 ft away. Second still silent. First relaxes. Second preens (more or less relaxed). Then both just sit.

I suppose that these birds are paired; but they certainly do not seem to be in copulatory mood (yet).

7:07 am. Second Giant flies in. Lands 20 ft from first. Now I see that new arrival is ♂! So first bird is ♀. Both birds utter loud Yelps and Rattles as ♂ comes in. Then both sit, with more or less slight CR. ♂ suddenly utters series of soft Yelps. But he does not fly. Shuts up. Both sit. Then ♀ utters series soft Yelps. Perhaps accelerated to "Tuck-a-tuck-a...". But really quite soft. And she does fly. Toward ♂. Lands 2 ft from him. And she goes into hunched posture and raises tail (definite). I.E. she is soliciting. ♂ immediately flies to her. Silently. Apparently lands directly on her back. As far as I can tell, cop movs. as usual. Can't tell if successful or not. Certainly lasts several seconds. Then birds fly off directly with loud Yelps and at least 1 Rattle. Disappear temporarily.

A few minutes later, hear more loud Yelps and Rattles in neighborhood. ♂ Giant flies in. Lands in near area. Utters loud Yelps and 1 Rattle as he comes. Then stands silently. With ½ CR. Does several Tailbobs. ♀ comes in a minute later. Lands 2 ft from ♂. Utters Yelps–Rattle–more Yelps while landing. I don't think that the ♂ utters anything. Certainly he utters less than she does. Then both birds sit. ♀ also semi-CR, does a few Tailbobs. Then both sit, still CR but no Bobs. Then ♀ utters series of short but fairly loud Yelps. ♂ looks at her, does one Tailbob, and flies

straight to her. Onto her back. Copulation again. This time being almost certainly unsuccessful. Both birds fly off. With Yelps. ♂ flies away, disappears. ♀ goes and perches in distant acacia. Sits silently. Then also flies away.

She comes back alone a few seconds later. Lands with Yelps in Pied pond acacia. Then sits silently. Semi-CR. Occasional Tailbobs of the usual type.

The birds seem to have stopped nest excavation. Why? Is the earth unsuitable after rain?

7:30. Abyssinians seem to have gone. But there are 3 Pieds around. In brush as usual. At least 2 are ♂'s. Some "greeting" Twitter-Rattles with F, CR, and (once) Wingspread. One ♂ keeps perching on bank. Sometimes hovers in front of hole(s). Different holes, I think. But he doesn't enter. Actually I think that all 3 birds here now are ♂. Lots of Looking (down) with CR. Some Shaking. Then more Twitters, etc.

Yes! Definite. All 3 Pieds here at the moment are ♂ - this looks almost like a "lek". Where is ♀??? Could she be incubating???

At least 2 of the ♂'s are hovering in front of holes from time to time. Certainly different holes. Is this part of "lek display"?

Both Giants have been away for some time. Then ♂ back 7:43. Flies into distant (Abyssinian) acacia. Utters Yelps as he comes in. No Rattles. Sits. Then flies to Pied pond acacia. Utters Yelps as he comes in. No Rattles. (The absence of Rattles in this context must be significant.) Sits. With occasional Tailbobs. Absolutely no CR (in fact real CS). And now I see that he has large fish (definitely) in bill. Probably 4"-5" long. Semi-crown. ♂ continues to sit. Makes no effort to swallow fish. Eventually flies away. Disappears.

Abyssinians still gone 7:52. And now the Pied seem to have disappeared! Presumably all gone together, as a group.

Single Purpur flies back and forth.

Abyssinian flies in. To usual tree. With "Arnk" Notes, trace of zigzag or rocking flight. Apparently attacks short-tailed glossy

starlings. Then perches quietly 10 ft away.

Abyssinian is displaced by small gray hawk. Flies off. Lands in tree by Pied pond. Utters "Arnh" Notes (can't see movs or postures). Flies off. Apparently swoops at Pied. Redirection. Flies off with "Arnh" Notes. No aerial display. But circles silently. Back to usual tree. Lands silently with Tail raise, 2 ft from hawk. Then utters more semi-growling "Arnh" Notes in extreme Diag V. Without Tail-swinging. (I.E. Swinging is probably partly sexual). Hawk flies off. Abyssinian relaxes.)

O photos both Pied and Giant holes. NOTE: there is a big pile of dirt below the hole that the Giants have been excavating.

Leave 8:10 a.m. On to Bac on way to Ziguinchor

Mal singing as usual at Bac 8:20

Coming back in afternoon. Last patch of tall trees and mixed veg before open stretch before Bac. See pair of Lilacs. Perching in large Fromager, 80-100 ft up. Every once in a while, one wd. makes brief flycatching flight. Utters Chatter in flight as it returns. This sounds very much like Rattling chatter of Bluebelly. Only perhaps slightly more irregular (and even more nasal?) Certainly quite loud.

Further on, in the open stretch, we see 6-7 Persians and 1 Abyssinian on wires. All quite far apart from one another

1:00 p.m. Open stretch past Bac. We see quite a lot of Whitefaces. Some in fami. close knit groups. Some apparently single. No other species around at the time. I.E. There is definite avoidance between Whitefaces and Persians (Doubtless the 2 open stretches on either side of the Bac must differ in some, perhaps average, respects. But they are remarkably similar on the whole. The division of areas between Persians and Whitefaces must be at least partly social.)

There did not appear to be anything of interest in the Giant area when we drove by a few minutes later.

Going to start out along first part of road to Parc 4:50 p.m. Hot and still.

See a Bluebelly in one of the usual trees in field.

Hear Yellowbills in forest.

Then see an Abyssinian in one of the usual trees of the species. Flies
✓ out. Catches insect in air (definite) 20 ft up. Flies back to perch. Swallows insect. Sits. Silent throughout. Sketch the bird while perched.

Walk on down to next little village or quarter

5:40. Single Bluebell, on R palm frond. Looking down on bare field

Walk further on, then back toward Ossonye, without seeing anything more of real interest

6:15. Back by cemetery. See single Mal perched 4 ft up in small tree in cemetery. Only a few meters from where Bluebellies have been seen on earlier occasions. No Bluebellies around now. There is a single Abyssinian very high in a neighboring Fromager. It utters several "Arrh" Notes. I doubt if these are reactions to the Mal.

This Mal has pretty dark bill. Little blue on breast. Juv.?

Mal flies off. Out of sight. Then I see it a few yds. further on. Flies to ground to get prey. Up again. Down again. Up again. All the prey catching seems to be silent. No Chatter like Sen. PARTIAL CORRECTION. This bird has bright bill. Thus there must be 2 inds in neighborhood. Another flight to ground. Also silent. Unsuccessful?

Moving on myself 6:25 p.m.

Ossonye
November 20,
1946

Going to the Giant area again this morning. Weather is clear. Arrive 6:45 a.m. Usual D.C.

6:51. Hear series of 3 Abyssinian type "Arrh" Notes apparently coming from near acacia. But I can't see the bird

A few minutes later, bird flies out of tree. Apparently down to road. Feeding so soon? Out of sight.

6:57. Single Giant perched high in Pied pond acacia. Apparently flew in silently. Sits with slight CR. Occasional Tailbob

haps 1 ft) from partner. Lands with tail spread. Stops vocalizing almost instantaneously on landing. As far as I can tell, the bird already in tree does not vocalize as "greeting". But then this bird, the presumed ♀, immediately starts to preen. While facing away from incomer. Preening quite vigorous, not stiff but rather "rushed" in appearance. Quite probably ritualized and/or displacement. Frequent preening under wings; at least twice preening under tail. All or most of preening under wings involves turning head away from partner. Also, of course, reveals dark blue of lower back and rump. Preening under tail involves (at least in these circumstances) raising the tail quite high. At least ↗ Reveals under-tail coverts. Also looks almost precopulatory. During all this, the incomer, the presumed ♂, stands in very high V posture, almost Agg V. Looks from side to side, "HF". Then BW's. Stands in V again, more HF. Emphasis is on looking away, rather than looking toward. All this is very reminiscent of the Bluebelly. (I didn't notice any ritualized fluffing at the time; but it may well have been present — in the presumed ♂.) Nothing more develops. The 2 birds gradually relax. Sit normally. Do relaxed preening from time to time.

One of the inds utters several "anh" notes → brief "chatter" when 2 long-tailed glossy starlings land 15 ft below in same tree. Obviously there is some hostility between the 2 species, at least these inds, this morning.

Stop observations 8:50 a m

COMMENT: the Abyssinians seem to be making "progress". But the Giants seem to be "retrogressing". Why? The bad weather 1-2 days ago? Interference by the Pieds? (Presumably my own appearance can not be helping.)

COMMENT: It occurs to me that the peculiar behavior of the Bluebelly and the Pied Kingfisher, the pseudosexual and homosexual tendencies, must at least permit or encourage individuals to form or survive in "clusters." The feeding areas of both species, bare ground and bodies of water, are discrete, sometimes dispersed, and semi-permanent (more permanent than a fruiting tree in fruit). If the resources are clumped, then it must be advantageous for the exploiters of these resources to be clumped also. The same patterns may equally favor density of populations, in addi

tion to, or even apart from, clustering. The Pied certainly is by far and away the most abundant of the local kingfishers. The Bluebelly, even now, when Abyssinians are actually common, seems to be the most abundant of the local rollers.

NOTE: the resources of the Abyssinian really do seem to be less clumped than those of the Bluebelly. The Abyssinian seems to prefer areas that are more open than those preferred by the Bluebelly, in the sense of having fewer trees and high bushes — e.g. ricefields and marshes — but it seems to be much less dependent upon actual bare ground — as in peanut fields. The Abyssinian also seems to fly catch more frequently and doubtless more expertly, than does the Bluebelly. And flying insects must be comparatively dispersed as a resource.

The difference between the <u>Bluebelly</u> and the <u>Abyssinian</u> seems to be <u>almost exactly parallel</u> to the difference between the <u>Redbill</u> and the <u>Blackbill (on Cap Vert)</u>!!!

Starting out along beginning of road to Parc 3:30 pm

Find the 2 Mals by cemetery. Bright-billed ind. perched 6 ft up, eating insect. Dull billed ind. 1 ft away, same branch. The latter makes several semi-bowing movements (low point looks like F of Pied). Fairly bright-bill. Silent. Both birds disturbed by passers-by. Fly off

Further on, see Abyssinian flying around usual Kades.

Walk along side path and back. Nothing of interest Except hippies!

Later go on to Kadjinol. Arrive outskirts town 4:35

See 2 Whitefaces in small Kade with large group (ca. 15 inds.) of swallows. All inds 6"–1' apart. This is the <u>closest</u> association between bee-eaters and swallows that I have ever seen!

Another Whiteface lands in another Kade. Silent and alone. Does several V-D Tailbobs after alighting. Three sits.

Swallows fly off, but the Whitefaces remain. Now there are 4 inds in one Kade, 1 ind. in another Kade. None is particularly close to a companion. All making flycatching flights. Apparently over field (pasture?). Silent as far as I can tell at this distance.

Now see lots more Whitefaces in more distant Kades. Some Wing

down temporarily.

This hubbub may have been provoked by the "intrusion" of a "strange" pair.

I am beginning to think that repeated single "Tseet" Notes may be the highest intensity and/or "purest" hostile Voc. of the species.

Then several of the Pieds gradually move over toward the Abyssinian acacia area. Intermittently active again. Some flying back and forth. Lots of "Greetings." Usually, I think between ♀ and one particular ♂. All the "Greetings" with "Twitters." All "Twitters" essentially of the "Tit-ta-ta-tuh" type. This sort of 4-note pattern is obviously the usual ambivalent hostile-friendly greeting pattern of the species (sometimes of course, with Rattle or Trill substituted for last note). At least one ind., ♂, makes repeated swoops down from Abyssinian acacia toward Giant pond and adjacent bank. As far as I can tell, these are not directed at an enemy. They could conceivably be fishing attempts. But then a ♂ also starts to land on bank itself.

It looks as if the Pieds were taking over the Giant breeding area in the absence of the Giants!!!

7:35. ♀ Giant reappears. Lands in Abyssinian acacia. Definitely alone. And, presumably significantly, her landing is quite silent. All the Pieds in the area, except one ♂, sort of drift away, back to their "own" pond, as soon as the ♀ Giant appears. The remaining ♂ Pied swoops at the ♀ Giant repeatedly. At least 8 times. All swoops apparently silent. ♀ Giant reacts each time by facing attacker, Gaping and Wingraising.

While all this is going on, one of the Abyssinians at the top of the tree is displaced by a pair of Long-tailed Glossy Starlings. Leaves without resistance. Or sound. Lands in another perch, lower in same tree. Eventually joined by its partner, who lands approximately 3 ft away. With Tail raise but nothing (else) in way of Greeting. Both Abyssinians are quite near the active Pieds, and then the Pied-Giant dispute; but neither shows the slightest visible or audible interest in either of the kingfisher species. It would seem that the Abyssinians are now reconciled to the presence of their noisy and violent neighbors

Once one of the Abyssinians flies off. Back with prey (same large species arthropod taken earlier this morning). Lands (again) approximately 3 ft from partner. With more or less Tail raise. (Again) no (other) Greeting. And newcomer eats prey all by itself.

♀ Giant eventually flies off. ♂ Pied makes frmal swoop at her in flight. Then returns to perch. There is some more Pied activity in the Giant area, more or less as before, during next 15 mins or so. But then the birds disappear from this particular area. Apparently again back in their own pond area. Probably becoming less active and noisy in general.

The ♀ Giant comes back later. Quite silent. Lands in near acacia. Same CR. One Tailbob. Just sits. Both the Pieds and the Abyssinians seem to ignore her completely. She flies off. Back again after a considerable interval. This time she utters Yelps as she comes in. No Rattles. Sits as before. Again ignored by both Pieds and Abyssinians.

At no time does the ♂ Giant appear. Nor does the ♀ do any digging. Or even visit the nesting bank area.

Everything quiet ca. 8:30-8:40.

Now there is only a single Abyssinian (♀?). 8:45. This bird suddenly utters several Growls (or long Growling "Arrh" Notes — essentially the same thing) in Diag V. These are followed immediately by series short "Arrh" Notes, accelerating and descending. Quite low and hoarse. This seems to be a sort of Chatter. Perhaps should be recognized as a distinct pattern. Very reminiscent of "real" Chatter of Blue belly and Chatter of Sen. I think that these notes were altered as the bird came out of the extreme Diag V into a less extreme "ordinary" alert posture. Then there is a pause of a second or so. Then the bird utters 2-3 ordinary "Arrh" Notes in ununtualized posture. At which point I become aware that the other Abyssinian (♂?) is approaching at great speed. Obviously at end of elaborate aerial display. Long rocking descent, at first gliding, then with beating wings, at angleconvex ca. Uttering series of "Arrh" Notes. Pauses between notes very short. Successive notes becoming increasingly more urgent, probably louder, almost "screaming" at end. Flying bird lands only inches (a) per-

6:58. Abyssinian lands usual perch in usual acacia. With Tail-raise. Immediately utters 3 "Arrh" Notes. (3 is obviously the usual number for short series!) Sits silently.

7:03. Suddenly, this bird and another Abyssinian fly into near acacia. Land close together. One utters brief, muffled, descending "Chatter" on landing: —→ Obviously composed of modified "Arrh" Notes. Then both birds sit silently. Preen. One flies a few feet away. Both continue to preen.

Looking up, I see that there is a gray hawk perched on usual Abyssinian perch in usual Abyssinian tree. Obviously the cause of the Abyssinian move. The hawk is displaced a few minutes later by an immature Hooded Vulture.

7:05. Another Giant flies in to Reed pond acacia. I can see that this is ♀. I.E. first bird was ♂. Loud Yelps and Rattles by both birds. ♀ lands 10-15 ft away from ♂. Voc. stop almost immediately after landing. ♀ has extreme CR, does several Tailbobs. ♂ has medium CR. Then both birds relax. Sit with only slight CR.

Then ♀ flies over to near acacia. Utters only a few soft Yelps in flight. Lands silently. Sits with slight CR. For some minutes.

Then ♂ flies over to near acacia. Lands 4 ft to the side and above ♀. Usual landing-greeting patterns. Both birds utter Yelps and Rattles as ♂ comes in and for some seconds after. ♂ has CR and does Tailbobs immediately after landing. Then both birds relax. Sit with only trace CR. ♂ does a little preening. Both birds utter brief Yelps and Rattles when group of 3 Purpurts passes by, at same time that a single Yellow-bill flies 50-100 ft away. I can't tell what provokes this performance. Then both Giants sit relaxed again.

Gradually ♀ assumes semi-hunched position (at least head is fairly low). Her wings are drooped but not spread. Tail is exposed between wings but not spread or raised. ♂ begins to utter series of many short soft Yelps. Does Tailbobs. ♀ utters 2-3 soft Yelps. ♂ drops down toward ♀. Still Yelping. Obvious cop. attempt. But ♀ flies away before he can land on her. She Yelps loudly as she

goes. She flies over to Abyssinian acacia. ♂, Yelping loudly, also flies to Pied Pond acacia. Obviously, the ♀ is not enthusiastic today!

NOTE: I think that one of the Abyssinians was still in the near acacia when the ♀ Giant flew in. But it was out of sight; and there was no obvious interaction between the 2 species. A few minutes later, an Abyssinian flew over to its usual acacia. Landed 3 ft from Hooded Vulture. Uttered several Growls in Diag V. Then relaxes. Sits. A few minutes later still, vulture still present, the same Abyssinian, same place, was seen doing silent Tailwavings in more or less ordinary sitting posture. Presumably motivation of Tailwaving is (slightly) qualitatively different from that of any voc. (esp. especially the apparently low-intensity "Arnk" Notes and high intensity Growls, both of which can occur without Tswings).

7:30. I notice that Pied Kingfishers are back in their usual area. There is at least one ♀ among them.

7:35. Vulture is gone from Abyssinian tree. One Abyssinian perched alone. Apparently relaxed. Then utters 2-3 "Arnk" Notes. A second later, a second Abyssinian comes in. Lands silently, with Tail raise, 1-2 ft from first ind. Has huge insect (or small land crab?) in bill. Sits. Then flies over to first ind. There is some sort of minor, confused, semi-scuffling interaction between the two inds. Quite silent. In the course of the interaction, half the prey is transferred from second ind. to the first. Second retains the other half. Second flies away a few feet. Lands quietly (no Tailraise?). Both birds sit, calmly eating their food. Then quit sil. period. COMMENT: I think that this was a real "voluntary", if not entirely peaceful, transfer of food. ♂ to ♀? Sex?

A few minutes later, there is a whole series of complex interactions near me. Suddenly the whole area seems to be full of active Pieds. Flying about, in near acacia (nc), and in, around, and between adjacent trees. Lots of flying and some hovering with "Tseet" Notes. Lots of perching with extreme CR and many extreme Tailbobs. I think that there must be 4-5 inds. involved. Apparently including 2 ♀'s. Eventually, 2 inds. (a ♂ and a ♀?) fly far away. The remaining birds quiet

spreading when one ind. lands next to another.

Walk down road and see more and more Whitefaces There must be at least 50 inds. around. See some more perched near swallows. Note: the swallows are Hirundo sp. (or, more probably, spp.).

Whitefaces certainly are the most accepting of bee-eaters!

NOTE: All or most of these Hirundo have chestnut throats.

The Whitefaces seem to flycatch less frequently or continuously than the swallows. They also probably average lower, now. Bee-eaters 6-15 ft up. Swallows 10-25 ft up.

5:04. Group (4?) of Purpurs flies by. From Kade to Kade. Uttering lots of "Ank" Notes and Rattling Chatters. The Whitefaces do not seem to pay any attention. Purpurs move on. Out of sight.

ADDITION: A few minutes earlier a group of shrikes, Corvinella, passed through much the same area. Perhaps 4-5 inds. This reminds me that I have never seen any interactions between these shrikes and any Coraciiformes. Perhaps surprising as the shrikes must compete with many other species. (But, of course, they are very different in appearance).

Shrikes in general are remarkably scarce in most of the areas in which I have worked. (The exception is the Lanarius species in the park at M'Bour.) Doubtless shrikes are primarily adapted to brush rather than to open country.

NOTE: All or most of the swallows seen with Whitefaces this afternoon probably were Hirundo lucida.

Bissouge,
November 21,
1976

Going to work in the Giant area again this morning, but I will try to concentrate on the Reds.

Arrive 6:45 a.m. Clear and cool

6:55. Abyssinian lands usual perch. Silent. With Tailraise Then Tailswinging. Then sits. Preens. Then utters 2 "Arrh"

Notes in Diag. V, Relaxes. Sits

6:58. The other Abyssinian flies in. From considerable distance. Utters several "Arrh"s in (normal) flight. Bird in tree utters several growling "Arrh" Notes as incomer approaches. In Diag V, Newcomer lands. First bird does nothing; relaxes. Newcomer, who has landed 10 ft from first bird, and with little or no Tail raise, stands in V, HF's several times. Then relaxes also. Both birds sit.

7:03. No trace of kingfishers yet. The Pieds certainly have not arrived. Where do they spend early morning?

First Abyssinian has flown off. Presumably to feed.

7:10. There is a Giant in Pied pond tree. Must have arrived silently. Flies off. Joins and apparently chases another Giant in flight. Both birds go off great distance. Fast darting, somewhat erratic flight, with occasional (even greater) accelerations. Looks hostile. But quite silent. Both birds disappear from view.

A moment later there is a Giant in top Pied pond tree. Again?? I can't tell if this is one of the inds. involved in apparent "chase" or not. Sits. Does one Tailbob. Sits with slight CR. Flies off

I think it is obvious that this species does not have long. Isolated inds. are usually silent.

Can hear Bluebelly or Purpuer Rattling Chatters in distance.

7:17. See single ♂ Pied perched fence over water. Silent and alone. Flies to usual brush pile. Still silent and alone. Sits. Slight CR. Lots of Tailbobs. Also lots of wing-flicks (!). Flies up. Utters some "Tseet" Notes. Then hovers repeatedly over water. Silent now. Finally plunges. Gets small fish. Flies off. Possibly 1 or 2 "Tseet" Notes.

COMMENT: these "Tseet" Notes are very unlikely to have been high intensity. They could, however, have been almost purely aggressive, with little escape, or purely hostile, with little or no friendly or sexual component.

Then chaos breaks loose 7:20

First the 2 Giants fly in together. Uttering lots of sounds. Yelps and Rattles. Definite tendency to arrange phrases in some ca-

several Yelps → Rattle, several Yelps → Rattle, several Yelps → Rattle. These sounds are uttered as the birds fly in and for a few seconds after landing. Birds have extreme CR; do several Tailbobs after landing. At first with (last) sounds. Then they shut up. Keep CR. Do a few more Tailbobs. Then sit, with decreasing but not disappearing CR.

Then there is a huge outburst of sound and activity by 4 Lilacs. Flying excitedly 30-80 ft up over wide area on far side of Pied pond. Obviously chasing one another. Uttering many long single "Aah" Notes. Also series of increasingly urgent, long, almost screaming "Aah" Notes, reminiscent of some Abyssinians at end of plunge at end of aerial display. Also many Chatters. Some semi-Rattling. Some low so. All this sounds very much like Coracias spp., but the general tone is even more nasal and "buzzier".

One of the Lilacs swoops at a Pied Kingfisher perched 10 ft up. Presumably redirection

Eventually 2 of the Lilacs perch, not close together, in tall Dead acacias 60-70 ft up. The other 2 continue chase furiously. One definitely the pursuer, the other the pursued. I think that they keep the same roles throughout the chase. Both vocalize. Perhaps the pursued only utters many single "Aah"s. The pursuer certainly utters single "Aah"s and the other patterns. The Chatters when (ever) the chase gets particularly close or furious. The series of screaming "Aah"s probably when the pursuer is making a swoop or semi-swoop. This last vocalization is particularly reminiscent of the Abyssinian. But it should be stressed that I did not, at any time during this sequence, see anything (more) like the "real" aerial display of Coracias sp. No pronounced rises or soars, with "tumbles" and subsequent precipitous descents. Just fast erratic twisting flight at a not very great range of levels above ground. No "rolling".

At one point, the 2 Lilacs engaged in the chase fly across the Pied pond to my neighborhood. Also fly (repeatedly) back and forth and around the Abyssinian tree. Both Abyssinians are perched

there at the time. And neither Abyssinian seems to pay any attention to the incredibly conspicuous and noisy Lilacs, sometimes only a few yards (or even feet) away!!! Nor do the Lilacs show any tendency to attack the Abyssinians in redirection or otherwise! This absence of overt interspecific reaction must, I think, have been "purposeful". A definite refusal to respond. (Abyssinians certainly respond actively to lots of birds that are less intrusive and less similar to themselves.)

Chase goes back across pond. Continues more or less as before. One of the Lilacs also "divebombs" an inoffensive flying Cattle Egret. Certainly redirection. (This makes the absence of attacks on Abyssinians all the more remarkable.)

Then one or both of the birds involved in chase land(s) in tall trees. More or less near the other 2 inds. There is some flying back and forth between trees and branches. Also more aerial chasing. All with vocalizations as before. But I cannot follow the details. Eventually the birds either shut up and/or drift away. But not far or for long.

While the Lilacs are at their most active, a lot more Pied Kingfishers show up. At least 2 inds on usual brush pile. And there is an actual performance. Usual sort of aerial chase of the species. The birds involved probably are 2 ♂'s and 1 ♀. Flying around quite near me. Usually 10–15 ft up. Not particularly close to the Lilacs at any time (now). These Pieds utter lots of Burglar-alarm Notes, Twitters, and Twitter-Rattles while flying. No actual pounces or swoops. The chase of this species looks tame by comparison with that of the Lilacs. Certainly covers much less territory. (The Lilac chasing must extend over 1/4 square mile. The Pied only a few hundred yards).

It is my impression, nevertheless, that the outburst of Pied activity may have been stimulated, in some way, by the outburst of Lilac activity. General air of excitement in the neighborhood? (I think that different species of Coraciiformes may stimulate one another not infrequently, even when and if their behavior is not very similar).

The Pieds also seem to calm down after a while. Perhaps at same time that the Lilacs move back across lake?

The Giants have been watching all the hubbub - more or less stolidly. Once they utter brief burst of Yelps and Rattles. (Note: Rattles always seem to be less frequent than Yelps). Difficult to tell what provokes this. Then the 2 birds sit silently as before. Then there is another outburst of Yelps and 1-2 Rattles. Certainly by ♂. Probably also by ♀. ♀ shuts up. ♂ continues series of Yelps. Moderately loud. Then, still Yelping (notes becoming progressively shorter, and lower and/or softer?) flies straight to the ♀ and onto her back. She adopts semi-hunched posture by the time he lands. He shuts up as soon as he lands. Copulation quite prolonged and apparently successful. As usual. ♂ grasping ♀'s nape, beating wings for balance, lowering and raising tails, etc. All quite silent. Then ♂ flies straight off ♀'s back. Silently. Disappears (across road?). ♀ sits. Then flies away also. Also silently.

All this is finished by 7:30 a.m!

I start to write up. A lengthy process. Notice several incidents in intervals.

One of the Abyssinians goes off (unnoticed). Remaining bird sits quietly. Then utters several "Arrrh" Notes in Diag. V when Psittacula lands in same tree, 10 ft away. I.E. this Abyssinian can be hostile, even today, if it "wants" to.

The ♀ Giant comes back to near acacia. Sits with semi-CR, looking toward bank with nest holes. But making no attempt to excavate. Then flies off. Certainly across road. Silent throughout.

8:10 See a Lilac fly by. Lands silently in near acacia. Sits quietly. But I also begin to hear Lilac sounds from Abyssinian tree And see pair of Pieds in Abyssinian tree at same time!!! Pieds are perched approx 20 ft up more or less directly over nesting bank. Single Abyssinian still on top tree (40 ft up?) Several Psittaculas slightly below - Abyssinian. Lilac in same tree is hidden by vegetation, but it is obviously 35-40 ft up, approximately half way between the Pieds and the Abyssinian.

Pieds are 1 ♂ and 1 ♀. Sitting quietly. Looking down. Little or no CR. About 6" apart, on different perches. Then ♂ flies down to bank. Hovers in front of nest hole! Flies back to rejoin ♀. This is repeated in more or less similar form at irregular intervals during next 10-15 mins

Once the ♂ actually perches for some seconds on bank after hovering in front of hole. But he never actually enters a hole while I am watching. Sometimes his flights and hovers are apparently quite silent. Sometimes he utters single "Iseet" Notes. (He also utters these notes when he flies in a little circle, once, after a visit and hover.) Every time he flies back to rejoin ♀ (landing anything from 4" to 1' from her) there is a "Greeting" by one or both birds. Not very high intensity. Always (usual) 4-note Twitter. The birds are too far away for me to see small details; but obviously these Twitters are not accompanied by anything very extreme in the way of ritualized postures or movements. Little or no F. Little or no CR.

I think that these birds must represent an interesting stage in the reproductive cycle. It would appear that a real sexual pair has been formed. Presumably this ♂ has somehow "extracted" this ♀ from the "group" at the Pied pond and brought her over here to the Giant Pond. And now he is "showing" her nesting holes. (NOTE: I think that he has hovered in front of several different holes. He is not, at this stage, showing any particular interest in the hole partly re-excavated by the Giants a few days ago. I am not, in fact, sure that he has ever hovered in front of that particular hole.) It would also appear that, in this species as in (all?) other Coraciiformes, it is the ♂ who takes the initiative in the first stage of "nest-building".

NOTE: I may add that the Giants do not reappear during my observations this morning. Their sexual life seems to be fine, but they would seem to have decided to nest elsewhere. Across road? It is interesting that they have done so after expending so much time and energy at this site. Doubtless it is better to be safe than sorry.

The rollers do not do much while the Pieds are busy in this way. The Lilac in the acacia near me and the Abyssinian at the top of its usual tree just sit, silently. The other Lilac, in the middle of the Abyssinian tree, is quite vocal by contrast. Utters occasional Chatters. More or less brief. More or less rapid. Then utters some more complex phrases. "Auk"-Chatter. "Auk"-Chatter-Chatter. Even "Auk"-Chatter-Chatter-Chatter. (These would appear to be the exact reverse of the Rattle-flights

of the Bluebelly!) Also some single "Auk"s. All at irregular intervals. Sometimes correlated with movements of neighboring birds. Once apparently provoked by landing and "Quoting" of ♂ Pied some distance away.

Then the Lilac in the Abyssinian tree is supplanted by a Psittacula. Flies off. With a couple of "Auk" Notes, I think. (COMMENT: perhaps the Psittacula parrots are more significant than I thought when watching Bluebellies at Cap Skirring.) The Lilac in the near acacia flies away, silently and unnoticed, a few seconds or minutes later.

Ca. 8:25. The Pieds have gone from sight. Single Abyssinian still at top of tree. Suddenly Lilacs come back. 3 inds. Chasing one another. Or one ind. chasing a second while a third follows along. (NOTE: the appearance of a "trio" in these circumstances may be significant. Does this species also favor 2-3-4 arrangements???) Fly back and forth, and often round and round the Abyssinian tree. 40-60 ft up. With lots and lots of vocalizations. Lots of "Auk" notes, ranging from ordinary singles, to accelerated series of screaming types, and Chatters. Also occasional clear thin notes. Like clear "Auk"s. The equivalent of clear notes of Purpur? High intensity??? Again no soars or tumbles or rocking. Every once in a while one of the birds (not always the same, I think) will perch briefly in tree, the near acacia or the Abyssinian tree. Once a perched bird (in the Abyssinian tree) is swooped at by a flying ind. Swoop apparently accompanied by low wooden Rattle! Another time, an ind sits in Abyssinian tree (hidden by foliage) utters long series of what could be described as "clucks". Abbreviated "Auk" Notes?

Lilacs would appear to have an extremely varied vocal repertory. Perhaps with more variants and intermediates than some of the other, smaller, Coraciiformes?

Once a Lilac sets out in hot pursuit of, and swoops at, a large bird of another species passing by. I don't see the incident well, but I think that the quarry was a hornbill, probably Yellowbill. I hear Yellowbill Single-Triple performances not far away a few seconds later.

During all this, the single Abyssinian (still or again) sits stolidly. Apparently ignoring the whole fuss. Or just stunned?

Lilacs eventually go off to large trees across lake (Peul pond).

8:35 a.m. See Abyssinian flying by trees across lake. I think that is involved in some sort of aerial dispute or fight with the Lilacs. (Perh aps attacked by Lilacs?) Then this Abyssinian flies over to join the other Abyssinian still perched top tree. Comes in more or less horizontally but with Rocking flight (beating wings) and screaming "Anh"'s. (There are some trees partly blocking my view, but I am almost certain that this approach was not preceded by a conventional aerial display of rise and tumble). Sitting bird utters "Anh" Notes in Diag V when approaching bird is still some considerable distance (200-300 m.) away. Shuts up. Newcomer lands silently with extreme Tail raise. Sitting bird does forward lean or Bow. (Same as yesterday) Also silent. Landing bird assumes V Posture. Bill horizontal or inclined slightly downward. Also does HF repeatedly away from partner. Partner just sits. Then newcomer relaxes. COMMENT: this sequence may be "usual" high intensity "greeting" display of the species!!!

A few seconds later, one of the Abyssinians flies away. I think the bird that had been perched for so long. Gone to feed in its turn?

I leave myself. 8:40 a.m.

COMMENT: The Abyssinians would seem to be making progress, but rather slowly. The Lilacs, on the other hand, seem to have received a sudden stimulus. It will be interesting to see what develops in the next week or so. The Abyssinians might be "dépassé"'d by the Lilacs in the same way that the Giants seem to have been by the Reds.

ADDITION: At some time this morning, 2 adult Purpurs appeared in R palm behind me edge Red pond. One ind. utters very loud Rattling chatter. Then both inds. fly on, past near acacia. Reds and at least one Abyssinian are present in the neighborhood at the time. Possibly also one or more Lilacs. But none of these species seems to interact with Purpur. These are not the species that are significant to the Purpur or vice versa.

Going to Ziguinchor mid-day.

1:00-1:15 p.m. Lots of bee-eaters on wires going toward Bac. Presumably White-faces.

At Bac, hear brief burst of Mal Song.

Also see single Black Kite wheeling over mangrove. As far as I can remember, this is first ind. of the species that I have seen in Casamance. Another example of migration. Re description and comments by Brown. Will more species be arriving?

Further on, we see a lot of Whitefaces on wires and bushes in open stretch before Nyassia. Note: this is not the stretch in which we often see Persians. Again the Whitefaces were quite closely associated with swallows. (Perhaps I should add some comments, just in case my notes of yesterday evening are not clear. Swallows and Abyssinians certainly keep apart from one another, at least when resting on wires. It is also my impression that swallows and other species of bee-eaters usually keep apart from one another. The accepting nature of Whitefaces does seem to be exceptional.)

Going out to Maguis in afternoon. Nothing of interest on the way. Only 1 Pied hovering over marsh.

Arrive parking site 4:35. See single Lilac land silently 30 ft up in tree. Out of sight. Then see another Lilac perched exposed 40 ft up in baobab 200 ft away. Then another (?) ind. lands same tree 50 ft away. No greeting. Both sit.

Lots of Cinns in 1'-2' high grassy veg. by pond.

NOTE: pond is much shallower now than earlier.

There probably are at least 15-20 Cinns here. Mostly perched very low. Also flycatching very low (rarely as high as 6 ft). One ind. definitely gets something from water. Whole head and breast wet as it comes out. Birds perch near one another quite frequently. Definitely no Wingspread. There is constant faint twittering in the neighborhood. But I can't tell how much is being uttered by the Cinns and how much by the many other small birds nearby.

Hear a few snatches Mal Song 5:00 p.m. Short conventional phrases. Then silence.

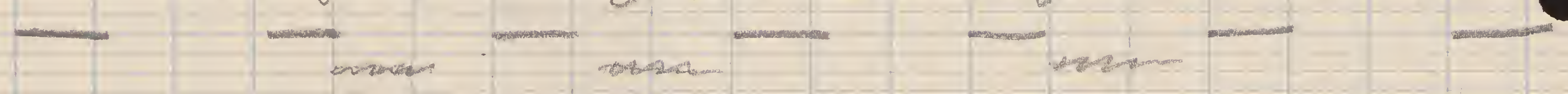
ADDITION: Some of the Cinns made constant (usually D-U) Tail wagging movements while perched.

Driving back to Ziguinchor, we see a number of birds on wires and in trees by road. Including 2 Abyssinians, several

Pied Kingfishers, at least one Bluebelly, and at least one Purpur.

It seems evident that there has been no great change in the avifauna here. No great influx of new migrants.

ADDITION; November 22. Coming back to Ossonye from Ziguinchor. Ca. 2:50 p.m. Last patch of forest before open stretch before Bac. Approximately same place where Lilacs seen a few days ago. Hear what sound like "Auh" (or "Aruh") Notes of Lilac (very buzzy or twangy) coming from site 40-50 ft up in large fromager. Single notes at regular intervals



The single notes, in themselves, were reminiscent of similar series sometimes uttered by Abyssinians. They could (also) be a sort of "Song". Sometimes a note of the "singing" bird was "answered" by a similar note of another ind. further away. Duetting?

See usual mixture or sequence of inds. and species along road past Bac. Plus lots of Whitefaces in tree by Pied pond. (No other Coraciiformes visible or audible at the time.)

Ossonye
November 23
1976

Going to try Grant area again. Arrive 6:45 a.m. Lots of mist on ground.

See single Abyssinian perched 30 ft up top near acacia. This is where I have heard sounds of the species on previous dawns. I think the bird sleeps here every night. It is sitting in rather hunched relaxed posture. Silent. Apparently alone. I.e. its mate or partner must sleep in a different tree.

Hear some Rattling chatters — and a single Purpur flies across road.

6:58. Single pigeon flies in. Lands top of usual Abyssinian "day" tree. On usual Abyssinian perch. The Abyssinian moved

rately leaves near acacia and flies into day tree also. Perches halfway up, in foliage. Utters 3 "Arnh" Notes. Silence. Then flies up to top. Lands 3 ft from pigeon. Utters 2 "Arnh" Notes. Then sits quietly.

7:02. There is one Grant (♂?) perched silently in Pied pond acacia. Semi-CR. Looking from side to side. ♀ comes in. Coming from low to S. Starts Yelping when several hundred m. away. ♂ starts Yelping in "answer". ♀ comes in, lands right beside ♂, but facing in opposite direction. Both birds continue to Yelp for some seconds. Also utter 2 Rattles in midst of Yelps. ♀ has extreme CR, does several extreme Tailbobs. Then both inds. relax. Sit silently with only trace CR. Pause lasts for several minutes. Then ♂ turns toward ♀. He starts to Yelp (moderately loudly). Hops directly onto ♀'s back, starts cop. But then both birds fly (♂ first I think) obviously before consummation. ♂ flies off and away. ♀ flies to another perch and then away. Both across road I think. Both silent.

While this is going on, a group of Purpures (at least 3 inds) ✓ flies in to R palm behind me. Some Rattling Chatters. Probably with little or no Bowing. One ind. gleans at bar fronds. Then all fly off.

7:15. Abyssinian has been displaced by 2 Hooded Vultures. First Pied flies in. Utters a few "Treek" Notes. Lands on bank. Out of sight.

Hear lots of Grant Yelps and Rattles across road.

Now there are 2 Abyssinians visible. In usual tree. But perched only 30 ft up, in foliage. 2 ft apart. Silent. This is exact perch used by Lolac(s) 2 days ago. Then another bird (a glossy starling?) lands in tree 4 ft above the 2 Abyssinians. Both Abyssinians utter several Growls or growling "Arnh" Notes in Diag V Postures. Then relax. Sit quietly again.

7:28. Mist is still quite thick.

One of the Abyssinians flies away silently.

7.32 See a single Giant fly over to marsh. Silent.
There do not seem to be any Pieds around now.

Then, in quick succession, a single ♂ Pied flies in, lands on bush with CR, Tailbobs, a couple of "Insect" Notes; a single Purple flies by silently; a single Lilac flies by, silently; and the ♀ Giant comes in, lands silently high in Pied pond acacia. There are plenty of birds around. Only they haven't been very interesting (so far)

♂ Giant comes in. Lands 4 ft from ♀. Usual Yelps and a few Rattles. (Rattles toward end of the performance. It is obvious that these birds seldom begin a medley with Rattles). ♂ has CR, also does Tailbobs as usual. Relaxes. Both birds sit. Both slight CR. ♀ in more or less flattened hunched posture. Every once in a while ♂ turns to her, and utters brief series of soft Yelps. Once with extreme CR. But he never tries to mount. Obviously his motivation is low now. The birds may well have copulated successfully out of sight across road earlier. Then ♂ flies away. Both birds utter medley loud Yelps and Rattles as he goes. ♀ remains, sitting quietly.

7:51 Suddenly there are 4 Pieds fishing energetically in pond. Shallow dives. Apparently for very small fish. Apparently successfully. Group is composed of 2 ♂'s and 2 ♀'s. Usual range of voces.
Then both ♂'s out of sight. Both ♀'s perch 6 ft apart. Preening.

♂ Pied lands silently in R palm behind me. Sits. Then ♀ starts to come in, apparently to land beside him. He does F, Wingspread, utters Rattle and/or Twitter-Rattle. ♀ flies away, circles, comes back. ♂ behaves as before, but this time also flies up and chases ♀ in air. More Twitter-Rattles. Obviously hostile. So ♂'s do not always welcome ♀'s!

8.01. Single Abyssinian in usual tree suddenly utters single long growling "Arrak" Notes in Diag V. At which point it is supplanted by a Youyou Parrot. Flies off to near acacia. Lands silently. Out of sight.

Then ♀ Giant comes into near acacia. Silent. Alone. Just stands with semi-CR. Then smooth crest.

Now I see that Abyssinian is still perched in near acacia. Probably 15 ft from ♀ Grant. No reaction between the 2 birds.

♀ utters a few Yelps and Rattles. Also hear Yelps and Rattles, presumably by ♂, in distance. Then ♀ flies off to Pied pond acacia. Silent. Sits.

8:12. ♂ and ♀ Pied land in Abyssinian acacia. Twitter Greeting. ♂ flies down toward bank, but then flies away. ♀ sits. Eventually flies off too. Probably in same direction.

Abyssinian in near acacia utters several "Arrh" notes when its partner comes into Abyssinian acacia 100 m. away. Latter lands silently with Tailraise. Everyone sits.

8:17. I am going for walk across road.

See ♂ Pied in R palm by large pond.

It is very still, no breeze, and warm already. Very quiet. Nothing of interest. Leaving 8:30 a.m.

Start out along beginning road to Parc 4:00 p.m.

See Abyssinian in one of the usual Kades. Also Bluebill in one of its usual Kades in field. Bluebill makes repeated flights to ground to feed. Actually there are 2 Bluebillies here now. A few m apart.

CORRECTION: there are at least 3 Bluebillies here. Possibly a 4th. I.E. group has not changed since observations last week or earlier.

2 inds. standing 4" apart. Very considerable apparent difference in size. Larger ind. in Agg U with Fluff, does HF. Smaller ind. in U without Fluff but with "Tilting". Also HF. Then both fly away.

4:15. 2 Yellowbills fly silently across field. From forest to village.

Walk part way around forest to stream. Everything very quiet. Walk back. Bluebillies still around.

Why are there no bee-eaters here???

4:45. Edge forest. Catch glimpses at least 2 Fistulators. In very large trees approx. 43 ft up. Move away. Wingbeats are noisy. One ind. utters a couple of brief, soft "Arrh" notes.

5:10. Walking back thru field. 3 Bluebillies still together. I flush them from a Kade and they fly over to small tree by cemetery.

Lots of Yellowbill calling in distance

Now see 4th Bluebell (definite) in Kade 1000 m from the 3 other inds. Everyone looks very hot. Lots of gaping. Some preening.
Stopping 5:35 pm

Orsonge
November 24
1976

Working along road to Samatit this morning. Arrive usual site, edge rice field, 6:40. Still dark.
Hear Hornbells (Yellowbells?) in distance
Also some conventional Mal phrases
Then quiet ca. 6:43. Then more general D.C.
6:46. 4-5 Bluebellies all fly out of crown same R palm I.E. they have all been roosting together. All fly into another R palm 100 ft away. Land close together. Some preening. Then all except one fly off. All silent throughout.
6:51. One Bluebelly still alone in palm. Another joins it. Lands inches away. Rattling Chatter by one ind. as Greeting Silence. Newcomer flies off again.
COMMENT: obviously, these are the birds that dispute d vigorously last week (or earlier). They certainly are, nevertheless, a real social group.
NOTE: the R palms here are over grass
Everything quiet for the next few minutes
Walk along dike. No kingfishers 7:05
2 Bluebellies, quite different in size, perched close together in R palm. Every once in a while, one makes flight to ground. Occasional Rattling Chatter as Greeting.
7:20. Single Blackbill flies by. Uttering Single Whistles
Then a single Yellowbell flies by, silently, almost same place Lands in R palm. I see it poking about center of crown, bases of fronds. Presumably not taking fruits, as all these trees are tapped

Then group of 3 Purpures shows up only 20-30 ft away. Also pokes around bases of R Palm fronds (different trees). Also scrambles up and down trunks. Some Rattling Chatters. Without Bowing.

Then single fen shows up, 40 ft from Purpures, somewhat farther from Yellowbell and Bluebellies (at the moment). Sits 12 ft up dead tree. Does 1-2 Head bobs. Suddenly flies off. Catches brown grasshopper, either in air, a ft or so above ground, or on stalks of vegetation above most of (the rest of) the grass. Flies to another perch and swallows insect. Then back to first perch. Sits. Does 2-3 WF's! Sits. Quite silent throughout.

Then watch same Yellowbell. Flying from R palm to R palm. Poking vigorously into or at bases of both live fronds and cut ones. Also silent. At the moment, this bird is feeding very much like a Purpure (altho its pecks must be stronger, and it never scrambles along trunks).

NOTE: All these birds seem to be more or less overlapping one another, and wandering through what is or used to be Bluebelly range or territory. But no one is paying any visible attention to any one else.

Then see a Giant Kingfisher. ♂? Flying high (100 ft up?) along edge ricefields and mixed veg. Long circling and figure-of-8 course. Uttering lots of Yelps. Loud. Sometimes in accelerated "Chatters", sometimes singly at regular intervals. No Rattles. Then descends toward ground, in long swooping glides. Silent. This is the nearest thing to an aerial display that I have seen in the species. But I can't see what preceded or what follows it.

Then Giant flies by, low, with more Yelps. Out of sight.

Hear another brief snatch of Mal Song in distance. Presumably in marsh.

Fen is still around. Utters Rattle after Rattle (not Song) while apparently alone. Going from perch to perch in small tree over rice field 6-8 ft up. Once does several extreme WF's immediately after landing.

Things temporarily quiet 8:00 am. Bluebellies, at least, seem to have gone. (Although they certainly were still around when some of the other birds first showed up.)

Purpuras reappear 8:10. As before. I think group may consist of one adult and 2 juvs.

Drive further along road. See a couple of Abyssinians sit on wires. In this region, the Abyssinians seem to prefer the relatively higher areas, scrub fields rather than rice. But all quite open.

A few yds. further on. One of the higher stretches. Very sandy. Grass with scattering low bushes, scrub, occasional trees of many different species. See a Lilac chasing and swooping at an Abyssinian. With "Aub" or "Arrub" Notes by one or both birds. Abyssinian lands in isolated R palm. Sits silently. Lilac turns back and lands in large leafless tree (looks like dead acacia). And now I see that there are 2 other Lilacs in same tree and 1 other Abyssinian. All the birds interact actively for the next 20 mins. or so. All very difficult to follow. But some points seem clear.

It is the Lilacs who are being aggressive. Apparently most irritated by the presence of the Abyssinians but also disputing among themselves. If redirection is involved, it is more likely that the Lilacs are venting their fury at the Abyssinians or one another than the reverse. There are attacks in all directions, but some of the attacks on the Abyssinians are much more vigorous than any of the intraspecific ones among the Lilacs themselves.

All the attacks are aerial swoops and chases.

Lilacs are extremely vocal. Quite a lot of ordinary, more or less single, often repeated "Aub" Notes. Also several kinds of apparently higher intensity patterns. Among them are:

A definite "Greeting" and/or "Landing" Call. Uttered by birds landing, both near and far from others. Also uttered by perched birds when others land, near or far, or even fly by. A nasal loud and fairly long note, followed immediately by series of 3 briefer, accelerating and/or descending notes. Might be transcribed as "Yaah tuktuktuk"

Essentially an "Aub" Note followed by a brief Chatter.

Attacks are sometimes accompanied by longer and louder "pure" Chatters.

Other attacks are accompanied by series of long but accelerated Screaming "Arrh" Notes.

My impression is that the attacks with Screams are higher intensity than those with Chatters. Or Chatters alone.

Of course, as would be expected, all these sounds can be combined or mixed in a great variety of ways.

The Lilacs attack the Abyssinians both when the latter are perched and when they are flying. Attacks upon flying birds are much more vigorous, pressed much further home, than attacks upon perched birds. Presumably as a result (or as an adaptation) the Abyssinians just sit quietly most of the time. Not responding visibly to the provocatory behavior of the Lilacs. (This also, of course, explains the behavior of the Abyssinians in the Grant area a few days ago). Abyssinians only fly very occasionally, from one tree to another, presumably when the general badgering gets unbearable.

Abyssinians are usually far apart from one another. A form of dispersal, to minimize or scatter attacks as much as possible? Only once in a while one or both Abyssinians utters "Arrh" Notes and/or Growls from Diag U Posture.

Abyssinians never fight back during first 20-30 mins of dispute.

The Lilacs do very little or nothing in the way of ritualized visual display. Tend to stand in semi-vertical or semi-horizontal alert or "preflight" postures between attacks. But no special head, wing, or tail movements — apart from some BW, which may or may not be significant. No real V. No Fluff. No WF's or TF's. No Shaking Centering. No Wingspreads during Greetings. No Tailraise on landing.

Fight gradually dies down ca 9:00 a.m., but traces remain or reappear until at least 9:20. During this later phase, while I am writing, I look up occasionally to see several incidents of interest. Once an Abyssinian, stung beyond endurance, supplants a Lilac. Uttering "Arrh" Notes as it does so. Once a Lilac swoops at a Youyou in a palm. Once a Lilac swoops at a pair of Psittacula. Once a Lilac swoops at a tree in which there is one Blackbill, a group of Turdoides, and a group of Corvinella.

The Fliers have become really very aggressive indeed! They must be coming into breeding condition.

9:30 a.m. Everyone seems to have left the area for the time being.

9:39. Further on. See single Pied and single Mal perched, not together, on wire over mangrove. Both silent. Then I hear Fen song not far away (but probably over drier land). Then ♂ Pied flies in, lands 1 ft from Mal. Mal flies off into mangrove.

These 2 species do not like one another. Dominance relations between them seem to be variable.

Photos. Also finds Pygmy some yds still further on. When I see the Pygmy it is perched 1½ ft up in mangrove. Silent. Doing constant Headbobbing. Apparently alone; but I see a second ind. 100 m + away.

9:58. Much further on, almost to Elimbuie Region of rice fields and open grass with only occasional trees. A single Bluebelly flies by, 20-30 ft up. Then a second follows, several hundred ft behind, same altitude approximately. Does 4-5 aerial displays. All shallow Gliding Soar → Wings beating → shallow Gliding Descent normally before and after. Then a third ind. appears. Approximately as far behind the second ind. as the second was behind the first. This also does aerial displays. The aerial displays of the 2 inds. are not, I think, synchronized.

Aerial displays are regular components of the repertory of the species.

Some of the aerial displays probably were silent. Others seemed to be accompanied by Rattling Chatters on Soar phase. Still others by "Anti" Notes during Soar.

All 3 birds fly far away to grove R palms edge field. Very difficult to see from here. But obviously high intensity dispute in progress. Apparently a pair (♂ & ♀? — considerable size difference) and an "intruder" (♂?). Beginning of dispute is much like the encounter among 5 inds. seen back down road a few weeks ago. Lots of flying back and forth. Lots of Rattling Chatters, "Anti" Notes, and Rattle-flurries. Two inds. also fly close together, zigzag and/or rocking paths,

with much gliding with V set wings. This presumably is at least partly hostile. But it certainly is much less rapid than "ordinary" aggressive pursuit.

Then the 3 inds. land in dead tree edge field. Pair together. 3rd ind. some yards away. Lots of V, Agg V, Fluff, HF, Looking, etc.

Then more flying around. From now on, while "dispute" lasts, only 2 inds. are ever visible. Apparently the pair. 3rd ind. is obviously hidden in palm grove. Invisible. But probably not very far away.

Pair land bare tree. Side by side. V's etc. Then one mounts the other, dismounts, the other mounts the one, dismounts, the one mounts the other, dismounts, the other mounts the one. I.E. 2 reversals. Both birds stand. V etc. Then fly off to grove. Presumably to display to rival.

Back in a few seconds. Land side by side. V etc. One mounts the other, dismounts. No reversal. Stand side by side in V etc. Then fly back to grove.

Back to dead tree in a few seconds. Land side by side. V etc. One mounts the other. Dismounts. No reversal. The 2 inds. stand side by side in V etc. Then back into grove. Disappear for some minutes.

Eventually a single bird flies out and far away. Back in direction from which group came. Silent. No display. A few minutes later, the other 2 birds, presumably the pair, fly out. Go in same direction. Utter some Rattling Chatters in flight. I also see one member of the pair do single aerial display.

All this is further evidence that "copulation" is used during hostile "territorial" encounters. Also that such "copulations" may involve (repeated) reversals.

Reversals probably are higher intensity than simple non-reversed performances.

Of course, the birds were too far away for me to see details. I don't know if the "copulations" involved tail movements or not. I think that the presumed ♂ always took the initiative. He probably did first mounting during the multiple performance, the only mountings during the simple performances. Some mountings (only by ♂?) were accompanied

by (muffled?) Rattling Chatters

We start back 10:40 a.m.

In the afternoon, ca. 5:00-5:30 p.m., we drive along road to Mambalang Bac. Almost to Bac itself. Usual Pieds and Abyssinians en pagaille. But absolutely no bee-eaters of any kind. I am beginning to think that it is true that these birds are active only during part (the middle) of the day.

Ossonye,
November 25,
1976

Going to start same place as yesterday at dawn. Road to Samalit and Elimbrie. "3 Bluebelly site". Arrive 6:40 a.m. Clear. Still semi-dark. Miscellaneous D.C.

First scratches Mal Song in distance 6:49. Shut up almost immediately.

I don't see any "sortie" of Bluebellies. but there is one bird in rather distant R palm by 6:58. Sitting hunched. Cold? Then flees off. Out of sight. Apparently the birds did not sleep in the same tree last night as they did the night before!

Sen perched silently 15 ft up top dead tree over grass and scrub by 7:04. Just looking around.

Hear Purpurs Rattling Chatters in distance

Now there are 2 Bluebellies in distant palm. A third comes in. No Quiting. All hunched. Flight to ground 7:07

More Mal Songs in distance 7:11. Conventional phrases.

Sen is still here. Still sitting quietly. It does not seem to have a mate around. Finally flies off. Perhaps not coincidentally at approximately same time as Bluebelly lands in manioc field ca. 300 ft away!

Group of 5 Purpurs appears. Scrambling over R palms as usual. Some Rattling Chatters and even one Twitter. Ignore and are ignored by both single Bluebelly and group of long-tailed glossy starlings not far away. But they do have a fight, with supplants and

chatter, with one or two Turdoides (presumably plebejus). Babbler eventually retreats

7:15. Group of 7 Yellowbills, more or less together, flies overhead. All coming from N. & E. from communal roost. Several inds. utter series Single Whistles in flight.

Sen is back from time to time. Bluebelly apparently gone from immediate neighborhood.

Purpurs fly (4-6 ft) over Sen. No reaction.

See one Purpur Allogroom another. Then the Purpurs move across rice field into small mangroves. Glean from leaves and branches. Move on.

Sun is just starting to warm things up 7:50

✓ See Sen get caterpillar from sandy road. Quite silent throughout (Note: it is much easier to study food habits of Sen than of any other species. Very infrequent of its choice of foods and feeding places!)

7:52. Pair of Giant Kingfishers flies overhead. This time they utters some Rattles as well as many Yelps ♂ flies on. ♀ lands 20 ft up in R palm over rice field. Sits with semi-CR. Then flies on silently.

Some Yellowbill Whistles and also Red Twitters in distance. See Yellowbill poking at bases R palm fronds. As yesterday.

Going to move on myself further along road, 8:00 a.m.

Reach area where Abyssinians and Lilacs seen yesterday. Find one Abyssinian perched quietly in dead tree. Flies over to adjacent acacia. Lands with silent Tailraise. Then flies further on. Hear "Arnh" Notes in distance. Then see bird. It is perched quietly 20-25 ft up top dead R palm (Of course, this trunk, like most others, has holes in it.)

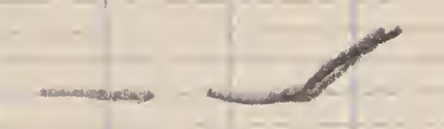
Then see single Lilac perched 30 ft away in top live acacia! Just sitting quietly.

Abyssinian and Lilac are facing toward each other. Then Abyssinian flies straight toward Lilac! Obvious attack. Lilac flies off. Abyssinian chases it around area for several seconds. Lots of "Arnh" Notes and chatters. Lilac disappears. Abyssinian flies back. Lands in acacia where the Lilac was before. Silent. Tailraise? Obviously this Abyssinian was dominant this time. Because encounter was 1 to 1???

Abyssinian just sits. Then 2 Lilacs land, silently, 4 ft apart, in dead tree where fight occurred yesterday. This is several hundred meters from where Abyssinian is now. Abyssinian does not seem to react at first. Both Lilacs sit. Then they utter brief burst of "Greeting" sounds. "Yaah-tuh-tuh-tuh"s ("Auh"-Chatter). Then sit silently again. Then they suddenly fly off to more distant acacia. (And) see Abyssinian in hot pursuit! Chase apparently silent. Abyssinian peels off. Lilacs remain in acacia, sitting quietly.

8:31. Single Carnifex lands in dead tree. And one of the Lilacs flies over to swoop at it with "Auh" Notes. Carnifex flies on. Lilac back to acacia. Lands silently. No "Greeting".

Why attack a poor old Carnifex? Redirection?

Actually there may be 3 Lilacs in this acacia. 1 or 2 fly off. Leaving one ind. behind. Sits. 20 ft up. Looking side to side. Occasionally utters single soft "Auh" Notes. Then louder "Yaah-tuh-tuh-tuh". Then doublets "Yaah yuhuh"  or "Yaah yuh" or
(Latter diagram may be most nearly correct. At least in some cases.) All the doublets relatively soft. Softer than real Chatters.

Could this be "Song"? It seems remarkably non-loud.

Lilac goes off on silent flycatching flight. Lands silently on another even further away. Then flies off again. Out of sight.

Then 2 birds back near dead tree. Land 4 ft apart. Quite silent. Then one ind. starts soft "Auh" again. Then both fly off. One does silent semi-swoop at the other. Both land. One in dead tree. One in adjacent acacia.

Then suddenly Abyssinian appears. Coming from distance. Flying high. 50-60 ft up. Regular flapping flight. Uttering "Auh" Notes in doublets and triplets. Then suddenly flies down, rapidly beating wings, to attack Lilac in dead tree. Abyssinian utters Screaming "Auh"s as it comes down. Lilac flies away with loud Chatter. Over to acacia. Abyssinian lands in dead tree. The 2 Lilacs make brief flight around acacia. Silent. But (again) one seems to make semi-swoop at the other. Then one Lilac lands back in acacia. The other flies over to dead

tree towards 20 ft from Abyssinian

Both birds sit. Lilac utters occasional soft single "Awh"'s and doublets. Abyssinian utters occasional single ordinary "Arnh"'s, and one outburst of Growls in Diag. V.

Then Abyssinian flies off. Uttering soft single "Arnh"'s. Flies straight toward me, and dives at me (?) with Screaming "Awh"'s!! Obviously redirection. Then flies off In high semi-circle. Flapping flight. Utters single, doublet, and triplet "Arnh"'s. Then dives down to dead R (flapping flight) with more accelerated Screaming "Awh"'s And lands there.

In the meantime, the Lilac in the dead tree has flown off to attack another bird (babbler?) in adjacent tree. Attack with Chatter. Also redirection??? Lilac goes back to dead tree.

9:00 a.m. All 3 inds. sitting. Fairly calm. Only occasional mildly hostile sounds.

Then hear Redbill "Whup" Notes, Single-Double performance, in distance! Many phrases in rapid succession. Bird apparently is in R palms or dicots edge field.

Have to leave myself 9:05 a.m.

Just as I go, I take a last look in the direction of the rollers. And see more interactions. At this point, there is one Lilac in the acacia, and one Lilac and one Abyssinian (far apart from one another) in the dead tree. A group of at least 9 Purpures suddenly flies into the acacia, then almost immediately into dead tree. The Purpures are uttering some noises, mostly brief muffled low-intensity Chatters I think, but they are fairly quiet, for the species, on the whole. No one attacks them in the acacia. When they get to the dead tree, the Abyssinian just sits and looks at them. But one of the Lilacs suddenly flies up and swoops at the Purpures. Lilac utters loud Chatter at peak of swoop or immediately afterwards. Purpures fly on without resistance.

COMMENT: Obviously the relations between the 2 different species of rollers here are still very unfriendly. But they are less continuously violent than yesterday. More nearly stabilized. It looks as if the Lilacs and the Abyssinian(s) may end up with adjacent, non-overlapping territories

Probably with the dead tree at the boundary.

I don't know what happened to the second Abyssinian or the third Lilac this morning. Could they be incubating? Already?

The hostile patterns used during the interspecific dispute this morning were particularly interesting in one respect. They were quite similar to what one would expect in an intraspecific dispute. Lots of vocalizations. Lots of redirection. And lots of rather tense "looking" at an opponent (doubtless combined with int. movs. that I missed). Not very different from a dispute among Bluebellies. Obviously (still) high intensity on the average.

Start out along beginning road to Parc 4:15 pm. It is particularly hot and oppressive.

Abyssinian(s) and Bluebelly(ies) in usual areas in fields.

Walk over to forest. See a couple of Purpures high (80-90 ft up) in large forest tree. Probing and gleaning. Uttering "Auh" Notes. Then one Rattling Chatter. Then more notes of same types. Birds out of sight.

Single Pied by stream in rice field.

Nothing more of interest.

Orsonge,
November 26,
1976

Going to try beginning of road to Parc again this morning.

Weather is clear and cool.

6:50 a.m. 2 Bluebellies fly into Kade in field. Land together only inches apart. Quite silent. Sit rather fluffed and hunched (obviously cold). Then one (♂?) starts to preen in a relaxed manner. This is obviously a "real" pair.

Where are the other 2 indivs? (At least one, and probably both, of the others was (were) around yesterday afternoon.

7:00 a.m. Single Purpure flies overhead. Utters single "Auh" Notes at regular intervals. Lands 30-35 ft up at very top

of dead tree, 200-300 ft from Rade of Bluebellies. Stands alert. Utters more single "Auh"'s at regular intervals. Then flies down. Starts to scramble and probe lower on trunk same tree. Utters a few "Auh"'s, at irregular intervals now, and one Rattling Chatter. Then continues to feed silently.

At almost exactly same time Purpur appears, I hear very soft Rattling Chatter from Bluebellies. Look up to see that third Bluebelly has landed 1 ft away from pair. And there is a fourth ind farther away in same tree. So "group" is still intact.

Two of the Bluebellies fly away, not together, in next few minutes.

7:03. Three Yellowbills fly over. Silent. Going from forest toward village. Neither Bluebellies nor Purpur seem to pay any attention. A few minutes later, hear Yellowbill Whistles back in forest. Doubtless forest is site of communal roost.

7:13. More Yellowbill Whistle performances. See the birds. 2 inds. 40 ft up tall Fromager edge forest. 10 ft apart. Both doing complete Single-Triplets occasionally. Both also doing lots of series of Singles without Triplets. Sometimes performances overlap. Sometimes not. Arrangement seems almost "random." Bill apparently closed during Singles.

Then one ind. flies away. Apparently interacts with some 3rd ind. out of sight. Lots of accelerated series of Singles. Bird left behind falls and remains silent. Then flies off to another perch a few feet away. Utters accelerated series of Singles as it moves. (Note: I think that I called these "accelerated Singles" in Notes earlier.)

7:24. Interactions still in progress. Lots of noise. But I can't see the birds.

It certainly sounds as if these inds are in breeding condition.

Then 3 Yellowbills fly (back) to forest from village. Obviously the 3 that left earlier. Silent in flight. Land tops tall trees in forest. Not together. At approximately same time hubbub stops! Birds move on. Out of sight.

Obviously the local Yellowbills have some sort of group organization, as well as or in addition to pairs (and families?)

I walk on closer to forest. Catch glimpses group of 4 Yellowbills. Moving more or less together through tree tops. Silent.

Lots of squirrels in forest. All Heliosciurus gambianus. At least one apparent pair. Inds only a few feet apart.

Go on a little farther. Hear long outbursts of Yellowbill "Begging". "Tee tee tee tee tee...... " Just as at Kadjmoul. Look up to see 2 inds 40 ft up in tree. One ind., perhaps adult, sitting quietly. The other ind., apparently the one that is Begging, is perched 10 ft away. Vigorously poking at, and chewing, thin dead branches. (The problem in studying Begging is that it seems to be uttered without movements of the mandibles.) Then both birds fly off a few yards. Out of sight. Silence during move. But then Begging resumes.

The Begging of this species seems nearly continuous! Goes on for minutes on end. But there does seem to be a tendency to break it into phrases. Brief pauses, usually after every 8-10 notes (sometimes after shorter series, sometimes after longer one)

NOTE: Some of the trees visited by Yellowbills this morning are the trees in which I saw Fistulators a few days ago. No trace of Fistulators here at the moment.

Walk on further. 8:00 am. Hear what sound like Purpur Rattling chatters in forest. Then see 3 inds. moving thru tree tops 60 ft up. Uttering occasional "Auk" Notes. (NOTE: the voice of this species is surprisingly loud. Louder than rollers. I always expect to see larger birds when I hear them. This presumably is an indication that Purpur groups are often rather widely dispersed?)

Walk on to stream. Then start back. 8:14. Group 3-4 Crinifers flies in. Into top tall forest trees. Feed on green fruits. Then a Yellowbill flies in. Lands 3-4 ft from Crinifers. Apparently "monitoring". Quite silent. Flies on. Comment: if the Yellowbill is more frugivorous than some other Tockus spp. — as might be inferred from its size — then it must also be in stronger competition with Crinifers (and

other turacos — viz also incident with green turaco at Djibelouhe).
8:21. More Yellowbill Single-Triplet performances in forest.
Single Yellowbill flies out of forest toward village. Silent.
On way back, see 3 Bluebellies close together in Kade in field. All 3 with well developed streamers. Then a 4th ind. flies out of another part of same tree. Followed by one of the trio. All silent. Still 2-3-4!
One of the remaining 2 Bluebellies utters single "Auh" when Crinifer lands only 1-2 ft away. Then ignores the Crinifer (and another ind. that flies in a few minutes later).
8:45 See group 8-9 Red Colobus high in tree in forest. Silent. Apparently no birds associated.
8:55 Further on. Flush single Abyssinian from usual tree. Flies off across road. Lands in distant Kade. As usual.
Walk around. Suddenly hear a lot of Abyssinian "Arrh" and Growling "Arrh" Notes. See that Abyssinian Kade is full of egrets, 2 spp. of starling, Piapiacs, and 1 small grey hawk. Abyssinian flies out. To tree 30 ft away. Lands with silent Tail raise.
As far as I can tell, there is only one Abyssinian in area now.
Stopping observations 9:15 am.
COMMENT: There has been remarkably little change among the birds here during the last few weeks.
Drive along road to Parc in afternoon. Start 4:30 pm
4:45. See pair of Abyssinians in Kade edge field. (Note: this species apparently does not occur in trios or quartets.)
Down to Parc itself. Yellowbills in full voice 5:01. At least 4 inds (2 pairs) involved. Singlet-Triplet series. Also accelerated series Singles.
5:40. Area rather broken forest. See group 3-4 Yellowbills moving 10-40 ft up. Quite silent. One is swallowing what seems to be enormous black beetle. Another is poking into large holes and crevices in large dead branch.
A little further on, see what may be partly same group. 7-8 inds gliding silently from high tree top to tree top. Going to roost? In fact, there probably are at least 10 inds around. Some back and

forth movements. Also some flapping flight. All quite silent.
Then lots of Whistles in distance. But near birds still silent.
Ol takes photos.
Stopping observations 6:00 p.m.

Osronye
November 27
1976

Going to try Giant area again. Arrive 6:30 a.m. Warm cloudy.
Hear Giant Yelps and Rattles in distance immediately.
No Abyssinian in usual tree. Or in near acacia. But there is a single ind. perched high in Pied pond acacia. Alternates periods of preening with periods of sitting silently with Tailswinging.
6:57. See that there is a single Giant (♀?) perched 25 ft below Abyssinian in same tree. Sitting silently. With crown almost smooth. Looking around.
Abyssinian flies away.
7:03. Group 5 Purpurs flies in to nearby palm. Silent. Land on fronds. One ind. utters one low, rather long, Growl. Very distinctive in sound. All fly on immediately. One or two soft "Arh" Notes in flight. Out of sight.
Hear first Pied Twitters 7:07.
7:08. ♂ Giant flies in. ♂ and/or ♀ utter(s) loud Yelps as he approaches. No Rattles. ♂ flies straight on to ♀'s back, definitely without perching beforehand. Copulation. Quite as usual. Rather prolonged. ♂ lowers tail at least 3 times. Apparently success ful. Then ♂ flies off to adjacent tree. Both birds quite silent throughout and immediately after cop. ♂ sits quietly. Little or no CR. ♀ continues to sit with tail raised for a few seconds then preens quietly. Little or no CR also

7:10. Abyssinian flies in with "Arnk" Notes. Lands silently on top usual tree, with Tailraise. Sits. Utters a few more "Arnk" Notes. Sits. Preens

♂ Giant flies back to tree in which ♀ is sitting. Utters Yelps in flight. Lands 20 ft away and above her. Both birds sit. Then ♂ flies away silently

There is not a breath of air now, 7:25. Everything quiet. And the flies, at my level, are dreadful.

Abyssinian flies down. Apparently catches hard insect (beetle) in flight. Back to perch. Silent. Starts to mandibulate and pound. Prey get away. Abyssinian catches it again. Again in air. Back to perch. More pounding and manipulating. Swallows prey.

♀ Giant is still sitting quietly at same place. ♀ "Ceryle" do seem to be placid! Then she suddenly utters loud Yelps. Apparently mixed with hoarse, harsh, not very loud Rasps! Are these variants of usual Yelps or Rattles???? Can't see what provokes performance ♀ shuts up. Sits quietly again.

Pieds flying around from time to time. Occasionally landing on fronds R palms by pond

♀ Giant utters several more series Rasps. Ca. 5-7 notes in one series. At least once she is sitting quite relaxed during series. Looking downward. Only slight trace CR (near point)

Then hear a few loud Yelps, presumably by ♂, some distance away. ♀ answers by 4-6 Rasps. Again in unritualized posture. Sits. Flits off. COMMENT: these Rasps sound as if ♀ were trying to utter low to moderate Yelps with a "sore throat"

♀ Giant has flown into near acacia. Sitting quietly after (presumably) landing silently. ♂ flies into another tree 30 ft away. Utters Yelps as he comes in. ♀ answers with Rasps. Both shut up. Then ♂ flies to ♀. He utters Yelps as he does so. Apparently cop attempt But ♀ utters Rasps as he approaches. Flies away to Abyssinian tree before ♂ can land on her. ♂ lands on perch instead. Sits with CR. Silent. Flies away. ♀ just sits in Abyssinian tree. Also silent

Obviously ♀ is uttering Rasps today in the same circumstances in which she used to utter Yelps. I am not sure, in fact, that she has managed to utter any "real" Yelps at all this morning. Something certainly has happened to her voice!

Two Pewfiners fly by with brief Rattling Chatters. No one pays any attention.

♀ Giant flies off, silently, to Pied pond tree. Sits.

Single Abyssinian still sitting quietly on top of its own tree 7:47

There are 2 ♀ Pieds in brush. Note: the breast patches of one ind. are relatively light and apparently brownish. (I think that I also noticed this the last time I was here.) Juvenile ???

7:53 See a second Abyssinian perched dead tree on far side pond. This is approximately where Lilacs were seen a few days ago.

Well Well! Well! ♀ Giant, still in top Pied pond tree, suddenly looks over across road. Utters perfectly good loud Yelps. In medley with Rattles. Sequence is Yelps – Rattle – Yelps – Rattle – Yelps. Then shuts up. Then utters another medley of Yelps and Rattle(s) as ♂ flies by. He utters similar sounds. ♀ flies off and follows him. Both land ca 6–8 ft up in small tree near me. Unfortunately on far side, so that I can't see them from here. But I hear a whole outburst of sounds, obviously by both inds. Including lots of more or less loud Yelps, a few Rattles, lots of Rasps.

Then I change my position in order to be able to see the birds. Obviously feeding of the ♀ by the ♂ is in progress! And obviously it is a difficult and tense process! The 2 birds are sitting 5 ft up. About 8"–12" apart. ♀ is sitting in more or less relaxed, even semi-hunched, posture. Little or no CR (only "point"). ♂ is sitting with extreme CR. And large prey in bill. Apparently partly mandibulated fish (perhaps 3" long) with intestines hanging out.

♀ turns head and bill toward ♂. Utters lots of Rasps in long series. ♂ just sits, looking downward, with prey in bill. This continues for some minutes. Then the birds start to move around a little. From perch to perch. All within radius of a few feet

It is obvious that ♀ is trying to get close to the ♂, but is slightly inhibited (afraid) to do so. It is also obvious that the ♂ is even more ambivalent. Sometimes he flies away a few inches or feet as ♀ approaches. Sometimes he approaches her, but "falls short", perches a few inches away, at the last moment. He keeps CR all the time. Sometimes he utters brief series of soft muffled Yelps in flight (Note: these may well be low intensity, but they are not at all like Raps in tone.) ♀ never has real or extreme CR. At best only rear point is visible. And she does utter Raps almost continuously. Usually with head and bill pointed or turned toward ♂.

Once ♀ waves wings while turned toward ♂ and uttering Raps. This looks somewhat like Q, but apparently is purely a balancing pattern. She does not do it again, even though she continues to "Beg" vigorously. ♂ also does similarly wing movements once, apparently just after landing awkwardly.

Finally ♂ flies and lands right beside ♀. Still with CR. A few soft Yelps in flight. Turns to her. She has turned to him and is continuing Raps. She starts to take food. He jerks away a little, but then stops. And ♀ lunges forward again and this time gets food.

This produces an immediate drop in social tension. ♂ immediately lowers crest, sits quietly. ♀ stops Raps and swallows food. Both birds sit for some seconds or even minutes. (NOTE: there is no sign of a copulation attempt in these circumstances) Then both fly off. Quietly.

ADDITION: Once, while this FB and Feeding patterns were in full swing, a single Pied flew around in a circle nearby. Uttering a few "Tuit" Notes. But it made no attempt to actually attack Grants.

I spent the next few minutes writing. During this period, I hear occasional Loud Yelps and a very few Rattles in the neighborhood. Obviously the Grants are moving around. But ♀ spends most of her time perched quietly in large acacia (one of the Lilac trees) on far side of pond. ♂ comes and goes (more) frequently. Usually utters a few Yelps both when joining ♀ (never very closely) and when leaving her

As far as I can tell, neither Giant shows any interest in nest holes or in excavating. This is a difference from Redbill. Is the giant nest hole already selected and completed?

ADDITION: I am fairly certain that the ♀ Giant uttered some Rasps when the ♂ flew in to copulate early this morning. Only my ears were not "attuned" to the sound at the time.

COMMENT: Obviously the Rasp is a distinctive pattern per se. A (relatively) non-hostile and/or sexual modification of the Yelp.

Now, 8:40, everything quiet. ♂ Giant perched in Pied pond tree. ♀ Giant still perched in Lilac tree across pond.

The single Abyssinian in the Abyssinian tree has been placid all morning. But it has uttered 3 brief series of "Arrh" Notes. Once when a short-tailed glossy starling landed nearby. The second time when a Hooded Vulture landed nearby. The third time when a second Abyssinian landed in tree (near acacia) a couple of hundred ft away.

8:47. All Abyssinians, and Giants, gone now.

Hear a few single Blackbill Whistles.

NOTE: Walking around, I see that there is yet another (3rd) earth bank with holes near Pied pond.

Leaving 9:00 am.

Go on to Sanatist at mid-day.

12:15 pm. See pair of Redbills in acacia in savannah area. Obviously ♂ and ♀. Big size differential. Silent. Sit and preen. One flies out and, apparently, chases or catches insect in air.

ADDITION: O & K saw both Redbills and Fistulators in semi-open comparatively high area on road here, near Kagmont, yesterday. I.E. it seems that Redbill is not really very rare in the region.

1:40. In village itself. Hear Yellow-bill Whistles.

A little later on, see ♀ Giant Kingfisher perched in trees, near small, shallow, rice fields. Presumably the species can feed here too.

CORRECTION: these are the small shallow ponds in which fish (Carpes' Tilapia?) are raised. Not rice fields.

See a single Pied flying in area too.

See the Giant make several low flights over surface of water As if it were fishing. But I don't think that it gets anything.

NOTE: the water in ponds presumably is more or less fresh. But there is mangrove on one side of area and real rice fields on the other.

1:58. Now all the birds are out of sight. But I can hear Pied "Tseet" Notes in mangrove

There are lots of holes in banks and dikes here. Must be made by crabs.

Then see one ♂ Pied perched 2 ft up mangrove. Utters Twitters or "Tseet"-Twitters ("Tseet-tuh-tuh-tuh" phrases) as I approach. Obviously reactions to me. Stop when I stop moving.

Now there are 3 Pieds flying around. Some hovering but no plunging. Go away back into mangrove.

Then a single Pygmy flies by. Silent and alone.

2 ♂ Pieds land together. Greeting of Twitters and Trills with F and Wingspread At least some CR. One ind. flies off.

Stop observations 2:15 pm.

COMMENT: It seems fairly evident that Giants, Pieds, and Pygmies can coexist ecologically in a variety of areas (n, also the pond by the Essoukoudiale Bac). Even if and when they are not really very friendly to one another

ADDITION: Passing Kadjinoul ca. 3:00 pm. See 2 Bluebellies in rural area, trees over Ipomea field. One flies away, from tree to tree, when I get out of car and advance. Each time (3 times) utters real 3-note Chatter as it goes. Each Chatter might be transcribed by something like "Chaah-chuh-chuh" ——— — Obviously with an appreciable escape component Obviously strictly homologous with so-called "Greeting" or "Landing" Chatter of Lilac

Does the Abyssinian have a Chatter pattern that is equally stereotyped and/or frequent?

Ossouye
November 28
1976

Arrive Grant area 6:30 a.m. Dark and cloudy

6:36 Hear one fer Song in distance

A few minutes later, hear several Mal Songs (conventional phrases) also in distance.

6:51 Abyssinian lands in Reed pond tree. Immediately utters 2 "Arrh" Notes. Then sits quietly

6:59. Hear many "Arrh" Notes in distance. Sound Abyssinian. But the bird here doesn't respond. Then it utters 2 "Arrh"'s a few seconds later when herons and pigeons land same tree. With Tailswings. Then shuts up. Continues Tailswings silently. Stops. Sits.

7:02. Finally see the other Abyssinian. It is perched in large partly dead tree on far side pond. Like yesterday. Still uttering "Arrh" Notes from time to time. No apparent response by nearer bird.

"Arrh" Notes may function as Song in some circumstances. But they certainly are not uttered very continuously by isolated birds at dawn!

7:07 Near Abyssinian does another bout of silent Tailswinging. Then stops again.

7:08. Hear Purpur Rattling Chatter in neighborhood.

7:09 Both Abyssinians gone. And I see a single Lilac perched in tree across pond! Silent. Flies off.

Everything is really incredibly quiet this morning. Why?

7:20 ♀ Grant flies in. Uttering a few loud Yelps. Lands 20 ft up in near acacia. Does 4-5 Tailbobs immediately after landing. All Tailbobs except one are accompanied by definite single WF's. Then sits quietly. Crest more or less down.

NOTE: I am sure that I have forgotten to record Tailbobs on numerous previous occasions. They are, in fact, "usual" immediately after landing. And common before flying off. But WF's are almost certainly much less frequent.

Suddenly ♀ Grant flies off! Across road. And then I see 3 Grants flying around in that area. With many loud Yelps, some Rasps, and a few Rattles. Then all birds out of sight. Silent

Then another burst of sounds. Loud Yelps and Rattles without Rasps.

NOTE: Giants are really much more common in this region than one might (offhand, at first) have supposed. Surprisingly common for such a large predator.

7:33. One Pied flies in. Uttering "Tseet" Notes. Then a second flies in. Also uttering "Tseet" Notes. Lands on brush pile. Does several Tailbobs. Certainly without Wing-flicks. Little or no CR. Flies off again.

One ♂ Pied lands in brush pile. Then another. Both silent. Both Preen. One with CR, one without. Then one flies to palm near me. With "Tseet" Notes. Lands silently. Does 4-5 Tailbobs after landing. No WF. Sits silently. Intent. No CR. More Tailbobs from time to time.

7:37. ♂ Giant flies in to Pied pond again. Utters loud Yelps as he comes in. Then sits silently. Some Tailbobs. See that he has large prey (fish?) in bill. Sits quietly. Little CR. A minute or so later, ♀ flies in. She utters loud Yelps and at least one Rattle as she comes in. ♂ Yelps in response. Perhaps also Rattles. ♀ lands 10-15 ft from ♂. Also Tailbobs after landing. Both sit silently. ♂ has extreme CR now. ♀ has crest smooth. Then ♀ flies toward ♂. This provokes more loud Yelps and Rattles, almost certainly by both inds. And ♂ flies away before ♀ reaches him. She lands more or less where he was before. He flies over to tree far side of pond. Still carrying prey. Both sit silently. Then ♀ flies over toward him again. Again this provokes loud Yelps and Rattles. Certainly by ♀. Probably by ♂. ♀ lands a few inches from ♂. ♂ shuts up. ♀ utters 2-3 Rasps. Stretches toward ♂. And he gives her prey immediately, apparently without reluctance! ♀ pounds prey, mandibulates, BW's, swallows prey. ♂ just sits, also BW-ing from time to time. Then both sit more or less motionless. Then ♂ starts to utter soft Yelps. In series. Gradually getting louder. Sounds almost "precopulatory". But he doesn't fly toward the ♀. Instead he flies to a perch 10-15 ft further away. Sits. Then ♂ flies away silently. Disappears. ♀ sits. Eventually flies away also. She utters loud Yelps and Rattles as she goes.

COMMENT: this feeding sequence certainly was <u>very</u> different

from the one seen yesterday! Today, the ♀ was much less "solicitous". Presumably also more openly hostile. But the transfer of food seemed to occur more early.

Have these birds passed the copulatory stage???

Two Blackbills fly by. Uttering single Whistles.

8:08. Hear more Mal Songs in distance.

There is some sort of Pied aerial chase in neighborhood. Involving 4-5 birds and lots of Twittering. Then 2 birds, ♂ and ♀, separate. Land together top near acacia. Sit quietly. ♂ flies down toward "Grant bank" With "Tseet" Notes. Then up to another tree. Out of sight. ♀ just sits. Then both birds fly over to Abyssinian acacia (near bank). Land 25 ft up. Twitters as "Greeting" as they land together. Then ♂ flies down. Hovers in front of bank, then perches on bank. Utters "Tseet" Notes in flight and after landing. Also Tailbobs. Then both birds sit. Then ♀ flies down, apparently to join ♂. (But) one or both bird(s) utter(s) Twitters, and ♀ flies on. Out of sight. ♂ sits. Then flies too.

Apparently these birds are interested in nesting. But they certainly are not in any hurry!

8:18. Single Grant flies by. Over pond. With loud Yelps and Rattles. It is swooped at by one of the Pieds (sex not determined).

Sun is coming out 8:21 a.m. I am going to walk a little.

See a single Abyssinian, silent and alone, in R palm far side pond.

Leaving 8:35 a.m.

Ossouye,
November 29,
1976.

In Ziguinchor in the morning. Drive back to Ossouye at mid-day. Notice a couple of things of interest on the way.

A single Abyssinian feeding, silently, on the ground.

A couple of definitely single Persians on wires past the Bac. No other bee-eaters around at the time.

Going to Samatiit this afternoon. Have to take long roundabout route via Mlomp etc.

Ca 3:30. See flock Whitefaces in scattered acacias over bare grassy field just past Kagnout.

4:12. Arrive back on usual road to Samatiit, area where Alyssinicans and Lilacs have been seen to fight. Clear and hot.

See single Alyssinican perched in R palm

Hear Lilac Chatter in distance.

NOTE: this area has considerably more scrub than the field in which Whitefaces were seen earlier.

4:25. But now I do see a couple of bee-eaters here, in distant tree. Can't tell species. Go a little closer and see that they are also Whitefaces. Flycat ching 4-15 ft up.

Single Blackbill perches silently 15 ft up dead tree. Quite far from both roller and bee-eaters. Then a couple more Blackbills fly by, uttering Single Whistles. No one seems to pay any attention. First Blackbill also flies away. In same direction as the others, I think. Yes! All going W. To roost already?

4:32. A 4th Blackbill flies by. Also going W. Apparently alone. But utters Single-Double Whistles in flight.

There are at least 4 Whitefaces around. Certainly a group; but inds seem to be keeping rather far apart from one another. Some of the inds. lack the long rectrices. Are they juv.?

Whitefaces utter quite a lot of noises in flight. Apparently all Creaks More or less high pitched. In irregular series.

One ind. sits silently with what looks like trace of CR. See sketch.

Group gradually moves on. Out of sight. Then I catch up with them a few hundred m. down road. Behaving as before. Very dull.

4.58. More Blackbill Single Whistles in distance.

Now there are 2 Alyssinicans around. One on wire. The other in R palm. Both quiet.

5:02. Suddenly see Green (definite). In rather scrubby area where Whitefaces were seen a few minutes ago. Flycatches 6-10 ft up. Then

perches in small tree 8 ft up. And now I see Whiteface flycatching perhaps 100 ft away from Green. The association between Whitefaces and Greens may well be "real."

Now I see that there are 2 other Greens flycatching 30 ft up above the perched ind. No apparent interaction. Flycatching birds move on. Then a second ind. lands 6 ft from first. No Greeting. Second bird preens. Then flies off again. Back. Again no greeting. As far as I can tell, both birds are quite silent throughout.

Greens fl. off. Disappear 5:26. Following Whitefaces (who also seem to have gone) ???

NOTE: the Abyssinians have not (yet) uttered a word here this afternoon. Nor have they paid any obvious attention of any sort to any of the bee-eaters. But it is perhaps significant that none of the bee-eaters ever approached an Abyssinian closely. Always at least 100 m. from nearest roller. Usually much more.

Leaving 5:50 pm

COMMENT: This afternoon's observations would suggest that the Abyssinians have won their dispute with the Lilacs. And that the Lilacs have moved some considerable distance (at least several thousand meters) away.

COMMENT: I am beginning to have some idea of the ecological distinction(s) between Greens and Persians. They probably feed in the same ways. But the Greens seem to prefer rather scrubby "up lands." While the Persians seem to prefer very flat, low, rice field and (low) mangrove swamp and mudflat.

On way back from Samatit, using regular road this time, region of rather scrubby forest (slightly high ground, probably rather far from mangrove) see single Mal standing in road. Very roller-like!

Ossouye,
November 30,
1976.

Going to try the road to Mambalang, but just outside Ossonge itself, this morning. Clear and cold.

Arrive 6:42 Moderate D.C.

Tide seems to be high.

6:59 Hear sudden outburst of Giant Kingfisher sounds. Many loud Yelps — 1 Rattle — many loud Yelps. So Giant is here too! Sounds seem to be coming from border area between extensive rice fields and large marsh. Can't see bird.

7:01. Lots more Giant sounds. This time from far away in mangrove swamp across road. Sequence quite stylized. Series of loud Yelps followed by one Rattle. This is repeated 6-8 times. It sounds like a duet, as if one ind. were uttering the Yelps while another ind was "answering" with a Rattle. (I think that I have noticed this duet effect before — without commenting on it.)

Giants certainly become active early in the morning.

7:09 Hear Bluebell or Purpurea Chattering Rattles in distance.

7:10 Hear first Pied sounds. Twitters (with accent on first note "Tseet tuk tuk tuk" — these phrases could also be described as "Tseet"-Twitters — six of one, half a dozen of the other)

More Yelp-Rattle series by Giant(s). Now the sounds seem to be coming from edge forest and marsh. If all the Giant sounds heard this morning have been uttered by a single pair, the birds have been moving over a very wide area. At least 1/4 mile across.

7:17. Hear Mal Songs. Also from edge forest. No other kingfishers audible at the time. Bird shuts up.

The Pieds here seem to be 3 inds. 2♂'s and 1♀, I think. Busy fishing. Perched on stumps in water and on wires. Every once in a while one ind tries to land on same stump as another. This always provokes outburst of display Twitters, "Tseet"-Twitters, and/or Twitter-Rattles. With CR, H (or other "pointing", and some Wingspread (possibly also a few other "minor" patterns). NOTE: the Wingspreads of this species seem to be more variable, apparently less highly ritualized, than are those of the Halcyon spp (or the Whiteface???)

7:33. Now the Pieds are doing a lot of hovering, in mangrove across road.

Stopping observations 7:50 a.m.

Walking along beginning of road to Mambalang this afternoon. Leaving town 3:30 p.m. Clear. Still comparatively cool.

Some Blackbills moving through large trees. With lots of Whistles.

Walk along edge forest and mangrove swamp. Tide seems low. Presumably not coincidentally, there are comparatively few active birds around. I have yet to see anything of interest by 4:19.

4:40 Pair of Fistulators flies in to top of tall Fromager. Both birds stand. Utter a few single "Arnh" Notes. Then fly off, faraway, apparently to distant forest across swamp. Utter a few more "Arnh" Notes in flight. Presumably ♂ and ♀. The size difference between the 2 birds is very considerable.

Then walk thru area mixed forest and farmland.

4:55. See single Lilac perched top tall Fromager. At least 150 ft up. Apparently silent and alone. But then it flies up with long series wing out, almost Screaming "Arnh" Notes. Out of sight.

Birds in general much more active now.

But nothing more in the way of Coraciiformes. So I quit 5:30.

Ossonye,
December 3,
1976.

Going to work at Giant area again this morning.

Arrive 6:50. Cloudy. Somewhat cool.

There is a single Giant (♀?) perched top of Pied pond acacia. Silent. Trace of CR.

A pair of Fistulators fly by. Silently. In distance.

Then I hear Abyssinian "Arnh" Notes in distance. Long series of notes. Coming from far side pond. I see that there is a pair of Yellowbills perched in dead tree there. But they don't seem to be relevant to the vocs.

Abyssinian "Arruh"s continue for minutes on end. Yellowbills sit. Preen. Then one Yellowbill starts to utter a few single Whistles. Between Abyssinian sounds. Then, 7:02, Yellowbills fly off. Abyssinian continues. Notes at fairly regular intervals. Is this Song?

♀ Giant flies over to near acacia. Quite silent. Then flies off again. Still silent. Out of sight 7:07.

Abyssinian uttering fewer notes at more irregular intervals now. I still can't see the bird.

7:12. Abyssinian flies into Abyssinian tree silently. Displaces pigeon. Sits with slight Tailswinging. A few minutes later, another Abyssinian flies in. Utters one "Arruh" while still at least 1000 ft from tree. The bird already in tree utters 3 "Arruh" Notes in real St (extra one Diag V) just as newcomer lands. Newcomer settles 4 ft away. Landing is silent. Newcomer starts to preen. First ind. just sits. Then flies away. Newcomer remains.

Everything very quiet 7:20 am.

Second Abyssinian eventually flies off also.

Occasional Yellowbill sounds in distance. Also, at different times, Purpurea Rattling Chatters.

7:28. ♂ (definite) Giant lands, silently, top Pied pond acacia. Sits quietly with semi CR. Does one Tailbob. Then ♀ comes in. Flying low over pond. Attacked by 2 Pieds in flight. Pieds utter Twitters or Twitter-Rattles in attack. ♀ Giant continues without swerving. Pieds stop attacks, peel off immediately. (NOTE. this is first visible or audible appearance of Pieds this morning. It is interesting that they attacked the ♀ Giant even when she was not engaged in nest selection or nest excavation.) ♀ Giant flies up toward top of Pied pond acacia. Lands 3-4 ft from ♂. Both birds vocalize when she is a few yards away from landing, continue for some seconds after landing is accomplished. I think that both inds. utter quite stereotyped Yelp-Yelp-Rattle series. 3 to 5 series per ind. Then both shut up. ♀ has CR, does many Tailbobs, immediately after landing, both during vocs and for some

seconds after. ♂ also assumes extreme CR and does Tailbobs, also during Loco and for a short time afterwards. Then both birds sit. Tailbobs stop. CR's gradually diminish. ♂ makes several (6-7) preening movements under wings. (NOTE: these do not look either hurried, nervous, or particularly rapid or rigid. But I think that they must be displacement. The ♂ showed no inclination to preen before the arrival of the ♀). The ♀ eventually does 2 preening movements herself. (Contagious? Also displacement?) Then both birds sit quietly again. Then ♂ begins series of Yelps (perhaps 10 notes). Beginning soft, gradually getting louder, does several more rapid Tailbobs, perhaps raises crest a little, and flies straight onto ♀'s back. Yelps stop as he lands. ♀ assumes low posture as he arrives, allows him to land without resistance. (NOTE: all this, especially the series of Yelps of increasing loudness, seems to be quite typical.) Cop. develops as usual. Silent. ♂ grasping ♀'s nape or neck. ♂ lowers tail. But cop is apparently unsuccessful. ♀ suddenly flies off with 3-4 loud Yelps. Lands another perch 10 ft away. ♂ flies off silently across pond. Then utters 1 or 2 Yelps. Flies to near acacia. Lands silently.

NOTE: it is remarkable how many of the cops. of this pair seem to be unsuccessful!!!

Both ♂ and ♀ Giant sit quietly, true CR, in their respective trees. Then ♂ flies off silently toward the ♀'s tree. Passes by it. Utters several Yelps and 1 Rattle as he does so. Flies across road and out of sight. ♀ remains silent, watches him go. Then she adopts an extreme but presumably unritualized F-type pre-flight posture, and then flies off, still silent, in same direction.

COMMENT: I think that my description of this cop., with the associated sounds, postures, and movements, is entirely correct. Or at least the best that I have done so far.

Some time later, ca. 7:40, I hear Abyssinian "Arnh" Notes. Look up to see single bird flying approx 40-50 ft up over Reed pond. In a circle. Uttering single "Arnh"'s almost continuously.
— — — — — — No trace of Doublet organization

Flapping flight. No Tailspread (SEE BELOW). Then bird rises (still flapping) a few yards, glides downward a few yards, still uttering "Arrnh"s as before. Flies horizontally a few seconds. Then up again with flapping flight. Rises higher this time. Then makes long glide downward

At first glide is straight, and accompanied by rapid Screaming "Arrnh"s → Then the bird shuts up. At same time begins to Rock from side to side (wings in V) And (glide) Rocks up to perch in usual Abyssinian tree. Lands. Sits. Looking alert. Utters 1 or 2 ordinary "Arrnh"s. Sits. Apparently no Tailswinging. Sits.

COMMENT: I imagine that this aerial display was somewhat aberrant. Low intensity?

♂ Giant comes back. Lands silently in near acacia. Sits silently. Then flies away again silently.

Abyssinian also flies away. Some time later seen an Abyssinian flying excitedly around distant palm far side of Pied pond. Uttering lots of "Arrnh"s. No trace of aerial display (rise and glide) as such. But I do notice that tail streamers are widely spread. Comme ca:

Ca. 8:05. See aerial chase involving 3 Pieds. All birds uttering Rattles. Obviously hostile

Everything very quiet again 8:20 a.m. Going to leave

Going out to Samatit later in morning

On the way, 9:25 a.m., abandoned peanut field, bare earth, some scrub, bordered by R palms. Find group of 4 Bluebellies. Hence 2-3-4 division as usual! Not very active. Some feeding. One ind. flies up from ground with "real" Chatter. Best transcription is: "Arrh urrh-urrh-urrh"

--- 0 photos

Further on, see an Abyssinian attacking a Pied Crow in flight. There are lots of Abyssinians along the road today!

Arrive fish pond area Samatit 10:25 a.m. Cloudy, cool, windy. Not much visible at moment

A Pied Kingfisher lands silently on perch. Then another lands silently on dike a couple of hundred feet away.

Then I flush 3 more inds. from mangrove. Fly away with Twitters.

See more Pied around from time to time. But they do not seem to be particularly noisy or active here now.

One ind. hovers and plunges (not deep) into fish pond.

Some Pied moves back in mangrove 10:50. Twitters. Rattles. "Tseet" Notes. Then shut up. Then hear Mal Songs. Far away. Shut up. Then more Pied sounds nearer by.

10:55. Pieds return to view. Seem to be divided into groups. One pair, ♂ & ♀, perched low on dike. A trio, 1 ♀ and 2 ♂'s, perched in mangrove 150-200 ft away. Some Twitters etc. when one member of a group shifts position slightly. Otherwise silent. Little CR. No Tailbobs. No Shaking.

♀ of "pair" flies away. Uttering Bisyllabic Notes as she goes. ♂ just sits. Then follows silently.

Hear single "Arrh" Notes repeated at regular few-second intervals. Look up to see that the notes are being uttered by a single Abyssinian perched, apparently alone, 15 ft up in acacia over rice field. Again, this makes me think of "Song." But the ind. shuts up after a minute or so.

11:20. Still no trace of either Giant or Pygmy. These species do have larger territories or ranges than Pieds.

Leaving ponds 11:25 a.m.

Ossouye
December 2
1976

Going to try edge of town, beginning of road to Mlomp this morning. Arrive 6:48 a.m. Cloudy and cool. (Note: it rained quite hard last night!) Moderate D.C.

7:04. Region of mixed vegetation, scrub, trees, peanut fields, R palms. A single Purpurpur flies in. Utters "Arrh" Notes in flight

Lands 30 ft up in tree. Utters more "Arrh" Notes. Then one typical Rattling Chatter. This is uttered from perfectly unritualized (rather upright) perching posture, With bill closed. No trace of Obliques or Bowing. But whole body vibrates in rhythm. Then bird utters a few more single "Arrh"s. Flies on. Out of sight.

This performance was revealing!

NOTE: Much of the habitat here looks excellent for Halcyon sp(p). The fact that I have not heard any Halcyon songs this morning must be significant. These birds apparently are not in breeding condition

7:30 Hear more Purpur Rattling Chatters Apparently coming from hedge of planted trees behind house.

NOTE: This area is full of drongos. But not of Coraciiformes. It must be too full of scrub and trees - not open enough - for most of the latter

But then, 7:48, I see large bee-eaters hawking for insects 20-40 ft up over scrub-field. At least 10-12 inds. I think that they may be Persicus. Apparently silent. Some inds are probably going 60-70 ft high in fact. It is common for them to rise on beating wings and then glide, gently downward, for many meters. Apparently not landing.

Actually these birds seem to be brown above. Are they European bee-eaters?

They seem to be quite successful in getting insects.

NOTE: There are few or no swallows or swifts with them.

7:58. Now they all seem to have moved on. Or settled. Out of sight. Aha! They have, in fact, settled. Perched approx 25 ft up top small, thick, rather large leaved dicot. They are Europeans. Inds. several inches to several feet apart. Silent. No display. Looking intently all around. Some fly off again.

Then a ♀ Yellowbill flies in. Lands silently 1-2 ft from a European. No reaction between the two birds. Yellowbill starts to utter Single Whis. The European flies off. Catches insect. Back to same perch. Still no reaction between the 2 birds. Yellowbill flies off with accelerated Whistles.

✓ It looks as if these bee-eaters may be catching flying termites (Stimulated to emerge by rains last night?).

Is it significant that there do not seem to be any rollers around here (now)?

Bee-eaters apparently gone 8:07 am. Walk down road 100 m or so. See 3 Europeans perched (hunched and cold looking) 40 ft up top tall Fromager over R palms and bean field. 2 inds 1 ft apart. The third about 4 ft away. A fourth ind. flycatching in distance. Then see more Europeans perched in adjacent dead tree. All 2-3 ft from one another.

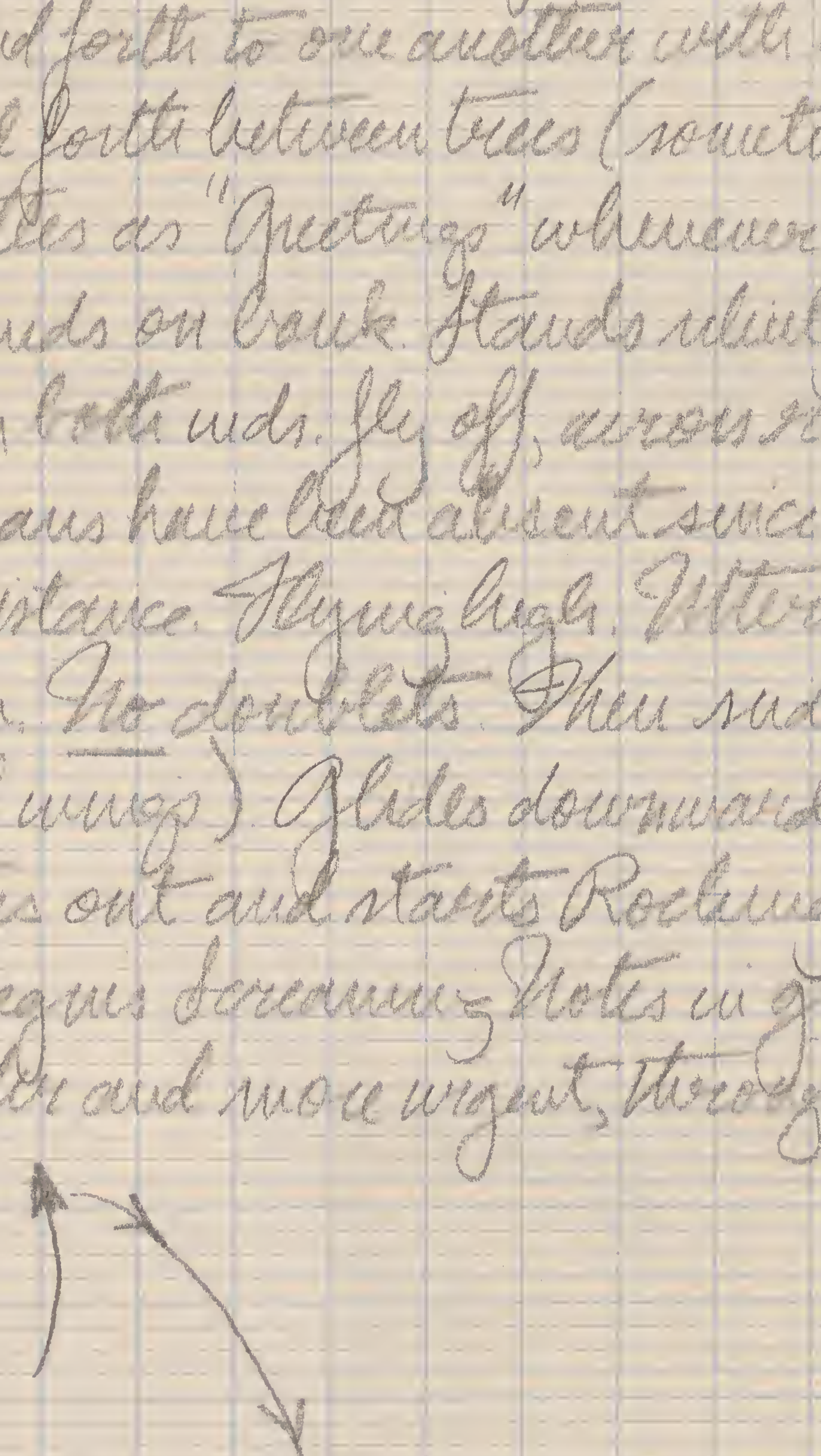
8:14. Suddenly they all fly up and go far away. Utter lots of notes in flight. Apparently Creaks. But peculiar. "Waugh" or "Wow" sounds. Apparently not in distinct phrases.

Walk down sidepath. Region of peanut fields and R palms. See group of Purpures in far distant dicots. Lots of Chattering Rattles.

Ca. 9:50 Go to Grant area to take photos. ♂ and ♀ Grant, on either side of pond, call back and forth to one another with both loud Yelps and Rattles. Then fly back and forth between trees (sometimes exchanging perches) with loud Yelps and Rattles as "Greetings" whenever they get together.

At one time, ♀ lands on bank. Stands silently with CR and Tail-bobs. Does not enter hole. Then both inds. fly off, across road, together.

9:59. Abyssinians have been absent since our arrival. But then one ind. comes in from distance. Flying high. Uttering single "Arrh" notes in regular rhythm. No doublets. Then suddenly flies upward. Stalls (with folded wings). Glides downward at increasing angle. Then semi-flattens out and starts Rocking. Rocks all the way to usual perch. Begins Screaming Notes in glide and continues them, progressively louder and more urgent, through Rocking. Flight can be diagrammed



Birds lands silently with extreme Tail raise

10:06 See that there are 3 Bluebellies perched close together in small tree by large pond across road. Probably only 2000 m from Abyssinian. One utters brief Rattling Chatter.

Go on much further down road, area mangrove swamp. 10:18 See single Bluebelly, single Pied, single Giant, all perched in mangrove bushes. Each about 1000 ft from the others.

Then Bluebelly flies off. Gets involved in dispute with at least 2 other Bluebellies. Lots of aerial chasing back and forth ca. 30 ft up over R palm grove. Birds partly hidden from view. But I do see several examples (perhaps 4) of a bird soaring upward and then gliding downward in obviously ritualized way. Both soar and glide fairly shallow. Both often or always accompanied by Rattling Chatters.

Fight subsides (at least out of sight). Then cross-fleeing. One Bluebelly sets out in hot pursuit. Very fast wingbeats. Utters phrase after phrase (5?) All stereotyped "Ank → Ank → Rattling Chatter". Chase continues several hundred meters. Then Bluebelly soars way upward. Probably silent during soar. Stalls. Then glides, almost plunges, steeply downward. Utters urgent Screaming Ank"s as it goes down. Then levels out near ground.

This is very, very reminiscent of Abyssinian. Only the Bluebelly did not do any Rolling.

10:40 Further down road. See several Whitefaces. Both on wires and on ground, on sand flats. 0 Photos.

Note: this is precise spot where Whitefaces were seen on ground a few weeks ago. I.E. this group probably is resident.

10:58. Back toward town. Find 3 Persians on wires. At least 10 m apart from one another. Uttering Creaks. "Creee" Notes. One ind. utters these in definite series, 6-10 Notes ______

Stretches neck upward and slightly forward with each series. Posture is slightly reminiscent of very low intensity Diag V of Abyssinian!

The series of essentially uniform notes, on the other hand (?), is quite reminiscent of hornbills. Perhaps this is "Song"?

Then one of the other rids. (mate ???) flies in, lands only 2 ft from "Singing" ind. Latter stops "Singing." Utters 2-3 more single creaks. Then falls silent. Then both fly off together, with more (single) creaks.

While the birds are perched, both silent and when vocalizing, they make constant up and down "balancing" tail movements.

This species certainly is not altogregarious.

NOTE: this particular area is mixed ricefield and mangrove I.E. typical of Persian.

After lunch, go down to Parc. See some Yellowbills. No other coraciiformes.

Later go along road to Dyckamoul-Mlamp.

4:26. Just outside Dyckamoul. Area mixed veg., field, etc. See single Lilac perched 20 ft up Kade. This is precise area where bee-eaters, Whitefaces, have been seen on previous occasions. But there are no bee-eaters now. More and more evidence that rollers and bee-eaters are incompatible.

Kutmong
December 4
1976

Here on a small visit

Driving out yesterday, we saw the usual, expected, birds in "savannah" and scrub. I was only struck by the great abundance of Blackbills.

This morning, we slept in. Heard lots of hornbill noises ca. 7:00-7:15. Both Blackbill Single-Double and Yellowbill Single-Triple series. Very little or no overlap between species. (In fact, there seemed to be only a single ind. of either species "singing" at any given moment.) It is my impression that the Blackbills averaged earlier than the Yellowbills.

Which reminds me..... Do Blackbills and Yellowbills tend to avoid one another? Do all the local species???

8:15 a.m. See several (pairs?) Yellowbills flying around Da Fromagers and Borassa palms around village.

Then hear what seems to be Begging by Yellowbill. So some of these birds have young out of the nest too.

It is interesting that "Song" continues, and apparently strongly, during this phase of the annual cycle.

Then hear some roller Chatter in distance. Lilac?

Then some Purpurr Rattling Chatters

See 2 Bluebellies perched, 20 ft apart, in dead trees over scrub-field. One feeds from ground.

See more single Yellowbills flying around. This would appear to be the dominant species of hornbill here. No reaction from the Bluebellies

But then I hear more Blackbill Whistles in distance. 8:45. Preceded and followed by Whistles by nearer Yellowbills. But, again, no overlap between species.

Single-Triple performances are being done by both ♂ and ♀ Yellowbills.

Different Yellowbills often overlap one another

NOTE: Fromager leaves are turning yellow, and beginning to fall off. This will make a big difference in the ecology of the area. Addition: Ofo says new leaves will come in April

A pair of Blackbills flies by silently.

9:10. A little further on. See single C. naevius ("Naevius") perched 18 ft up in dead tree in midst of mil field. Silent and apparently alone. Flies away. Out of sight.

9:43. Another field. This time gros mil. See group of at least 3 Purpurs. Flying from stalk to stalk. Scrambling as if stalks were tree trunks. Uttering occasional "Arnk" Notes. Flew off to small trees bordering field. Correction: group includes at least 4 inds.

10:04. See single Naevius (again). Perched 20-25 ft up in Kade over same mil field as before. Silent and alone. Flies away. Out of sight. This ind. seems to have, as expected, a large territory or range.

Then group of 5-6 Purpurs flies out of nearby trees. Into another Kade in mil. Some Rattling Chatters

10:20. Another quarter (Kaback - Bedjilan). See group of 3 Blackbills. Silent. Moving quietly 30-40 ft up in large Fromager (almost no leaves but lots of fruits). 2 inds have yellow or light frontal skin. Family group?

There also are lots of Purpurs around in general neighborhood. See adult and presumed young probing branches and trunk of Kade. Several (2?) more inds. join group. One ind pounds into dead stump of branch. Definitely extracts beetle grub. Ephotos

Then 4 go on to large Baobab. Lots of Bowing and Rattling Chatters. Group apparently divided 2 x 2. Pairs???

COMMENTS: This morning's observations were mixed and spotty. But some of them were of interest ecologically.

Blackbills and Yellowbills certainly overlap broadly in some respects here. In both habitats and territories or home ranges, if not in Songs. But the Yellowbills are seen relatively more frequently in the very tall planted trees in and around the various quarters. While the Blackbills are found relatively more frequently in smaller trees (acacias, etc.) in second growth scrub. (Addition: we saw 2 Blackbills on the ground,

the road, on the way here yesterday afternoon. The Blackbill may be more often "terrestrial" than the Yellowbill, even if less so than the Redbill.)

I saw an Abyssinian here by the rice fields earlier this morning. The Abyssinian seems to have a definite preference for such "low" open habitats as rice and mangrove. We did see Abyssinians in "upland" scrub along the road to Sawatut; but here the equivalent environments seem to be occupied by Bluebellies (and Navvies).

Go out walking again 2:30 p.m.

Group of 6 Purpuras in large trees near village. Lots of Rattling Chatters. Note: the Chatters of this species are particularly loud.

A few minutes later, lots of Blackbill Single Whistles. This is certainly Yellowbill territory; but there are no Yellowbills visible or audible at the moment.

A Bluebelly flies down to ground from Fromager. Not far from either Blackbill or Purpura. No reactions among species. Bluebelly flies up.

Then see Purpura on ground not far away. And some others very low on tree trunks. Paying no attention to long tailed glossy starlings still a few feet away. NOTE: At least several of these Purpuras have dark bills. Do it? Some of them also have brownish feathers on face and chin. These must, I assume, be juvs.

Yes! See one ind. that has brown face, black bill, and relatively short central tail feathers.

This ind. is near an adult. 20 ft up in dead tree (fig?). Another adult lands near by. Some Rattling Chatters, some fast enough to be called real Rattles, but I think little or no Bowing. Then the 2 adults fly off to adjacent tree(s). Juv. remains sitting. And I hear very soft sound coming from its immediate area. Long series of notes. Not absolutely continuous, but long phrases broken up at irregular intervals. Might be transcribed by something like "cheh cheh cheh cheh cheh cheh cheh cheh cheh ... cheh cheh cheh cheh cheh cheh cheh ... cheh cheh cheh cheh cheh cheh cheh cheh cheh cheh cheh cheh cheh ... cheh cheh ...," all soft. General effect almost twittering. Bill is not opened with notes. But tail does quiver in rhythm. This must be Begging.

Begging of long nearly continuous series of notes without OCB is reminiscent of hornbills (the Yellowbill).

As in the Yellowbill, there is no Q.

Watch this bird and its associates for several minutes. Obviously group of 2 adults, parents, and at least 3 juveniles. All juveniles Begging nearly continuously in same way.

Adults fly back and forth between trees. Every once in a while, fly to a juv. and feed it. Definite. Can't identify food in most cases. But some of it is being obtained center crowns R palms. At least once, I think that food given is part of R palm inflorescence.

Whenever an adult comes near, juv. rushes (hops or flies) to it. Transfer of food is rapid. Apparently easy. But often (usually?) accompanied by low throaty Growl. By adult.

If one adult lands near another, there usually is some Rattling Chatter. Sometimes with brief Bowing or at least Bowing int. movs. (definite in at least 3 cases). I think that the juvs. do not participate in this particular form of display.

But juvs. do fly from tree to tree. And they sometimes utter typical hoarse nasal "Arrh" notes in flight.

A single Blackbill flies into tree no more than 20-30 ft from Purpurs. Silent. Apparently ignores and is ignored by Purpurs. Flies on. Out of sight.

A few minutes later, see Bluebill feeding from tree only 30 ft further on. Also silent. Also apparently ignores and is ignored.

5 mins later, see single Yellowbill land in top fromager 50 ft away. Makes one apparent "flycatching" flight. Also silent. Moves on.

If these birds are responding to the Purpurs at all, it is only by remaining silent!

Purpurs still continuing actively 3:20 pm. Two juvs. do brief but otherwise quite typical Rattling Chatter(s), with Bowing, when one lands beside the other.

Hear a few "clear" notes, single or in Rattling Chatter rhythms, from time to time. Almost certainly uttered by juvs. I.e. their voices

are not fully adult yet.

COMMENT: It is beginning to look as if this species may turn out to be almost perfectly intermediate between rollers and Tockus hornbills.

Hear 4-5 Growls uttered in single "burst".

Then Yellowbill gives Single-Triple performance in neighborhood. The Purpurs do not seem to be disturbed.

Walk further down road.

3:40. Lots of Yellowbill vocs in several areas.

Go on to area where Naevius seen this morning. Nothing around 3:46. Then a single Naevius flies in. Lands unnoticed (silent?) in dead tree! Note: it is a surprisingly slim-looking bird. It seems to be uttering many rather soft, "dry", not particularly nasal "Arb" Notes. Sometimes with OCB. Sometimes without. From unritualized perching postures. Then sits silent.

Flies off. Catches insect (in flight???) Lands on another branch of dead tree. Wags tail up and down 4-5 times in very bee-eater like manner, immediately after landing. Then sits silently. Flies off. Out of sight.

Note: the species certainly is comparatively long winged as well as generally slim. SEE SKETCHES. Is it comparatively "aerial". The color pattern (also) is reminiscent of Lilac. Does it compete with Lilac? Does Lilac occur in this region??? (I thought that I heard it this morning; but I could well have been mistaken.)

Moving on 4:31 pm.

Katinong
December 5
1946

Arrive Naevius area 6:40 a.m. Clear and cold. Not much in the way of D.C. No coraciiformes.

First Blackbill Single Whistles in distance 6:51. They stop. Then some Yellowbill Whistles. Also distant but in a very different direction.

Then there is some partial overlap between calls of a Black

bill and calls of a Yellowbill. But the 2 birds are very far apart from one another.

Then general quiet (among Coraciiformes) for a while.

Then more Blackbill Whistles. Bird shuts up. Then a Yellowbill Single-Triple. Nothing else audible for the moment. Then more Blackbill Single Whistles (not Doubles). Overlapping Yellowbill Single-Triple completely. Also other Single Whistles by Blackbills flying nearby.

Such mutual inhibition of Song as exists here does not extend to other vocal patterns such as Single Whistles alone.

7:02. Pair of Purpurs fly into adjacent R palm stand out of sight but with enormous burst of Rattling Chatter.

Then a group of 5 Purpurs flies by in distance.

Purpurs probably are more abundant here than anywhere I have ever worked. The local mix of vegetation seems to be perfect for them.

7:08 Small gray hawk lands in Naevius dead tree. Eventually joined by a pigeon and a glossy starling. Neither at all afraid. All the birds eventually fly on.

7:13. More Yellowbill Single-Triples. By several inds. Not overlapped by any Blackbill sounds.

7:14. Single bird flies by. Straight flapping flight. 15 ft up. Uttering most peculiar sounds. 4-note phrases. Repeated many times. Each phrase something like "Tuh-tuh tuh-Aouh"

As far as I could tell, this bird was a Naevius. Flies straight off. Out of sight.

A few seconds later, I hear Bluebill Rattling Chatters and "Ach" Notes in distance. Coincidence???

7:30. Group of Purpurs flies into Borassa palm. Inds. glean on both trunk and leaves. Rather quietly. Then move into R palms and [illegible]. Then 2 inds, apparently both adult, fly into low bush in [illegible] field. One grooms the other, on flank and (probably) under tail coverts. Silently. Then both move on.

The whole group of Purpurs eventually moves on to another, more distant R palm. Then a single Blackbill flies in. Silently. Lands 2 ft away from Purpurs same palm. No apparent reaction between species. Blackbill flies on. Still silently.

Sun beginning to reach this area 7:45.

Some of the Purpurs fly down to feed on mil stalks and in low bush. Then another (?) Blackbill flies into same bush. Again silently. Again no visible reaction between the species. But are the Blackbills attracted by and/or "monitoring" the Purpurs???

The ♀ Blackbill flies into adjacent Kade. So, after a minute or so, do some or all of the Purpurs. But then 2 other Blackbills appear in the neighborhood. One of the Blackbills (probably the first ♀) does Single-Double. Then the Blackbills move on. Apparently not followed by the Purpurs.

Everything quiet 7:55 a.m. Going to move around. In direction in which presumed Naevius flew.

Almost immediately find the Naevius (identification definite). Flying around excitedly and swooping at something. Apparently gray hawk in dead tree. Flying and swooping accompanied by lots of loud, urgent sounding "Anh" Notes. Quite nasal, but not particularly twanging. Almost Screaming in quality but not really an accelerated series. Then Naevius flies away. Stops calling at same time. Lands 50 ft up top tall tree 100 ft away. Sits silently. Just looking around. The hawk flies away in a different direction a few minutes later.

Naevius flies away. Silently. I think into Baobab or adjacent Kade. But out of sight.

Then I hear more Naevius "Anh" Notes in distance. I go in that direction. See 2 (other) Naevius perched 60-70 ft up top of large Gorom ager (fruits but no leaves) over scrub. Now sitting quietly. 10 ft apart. Sit for some minutes. Then one flies away. Out of sight. The other apparently does the same some time later.

COMMENT. All these birds have been perched so high that they can hardly, at the time, have been interested in feeding from the ground.

8:25 See 2 Yellowbills in R palm. One is Begging steadily

Walk on back toward village. Just on outskirts, find 4 (more) Rollers. Engaged in complicated series of interactions. Obvious by a whole or (less probably) partly hostile dispute. Very difficult to follow (as usual with rollers); but I did catch the following:

When first seen, all 4 inds were in top of baobab. Probably 35 ft up. 3 close together, within inches of one another. The fourth a few feet apart. Not doing anything very spectacular. But probably quite tense, threatening and interacting by "hints and indirections", rather like Blue bellies at La Paillotte No Agg 1's as far as I can tell. But one of the inds in the group of 3 is facing away from the others. One or more inds may assume an "F" posture occasionally. There may also be some vocalizations, but I do not catch them very well at this stage. In any case, nothing very loud.

Then there are 3-4 supplants. Silent or quiet. Supplanted bird(s) fly(ies) away without resistance. But apparently only to another part of tree. Partly out of sight. But apparently threatening and supplants continue intermittently.

I move a little closer and begin to hear, or become aware of, sounds. Lots of rather low notes. Many of them might be best transcribed as "Uuh" (but they are obviously either the same as, or very closely related to, the sounds that I transcribed as "Arh" yesterday. And also related to "Auh"'s heard earlier today). Sometimes uttered singly or in irregular short series. But more often in doublets. Sometimes "Uuh-uuh". More often with second note louder, emphasized "Uuh-<u>uuh</u>". Sometimes second note is quite loud indeed. In which case a doublet could be transcribed as "Uuh-<u>Aouh</u>". (The relation to the quadruplet series uttered by flying bird at dawn is obvious.)

I catch glimpses of several inds. in several kinds of F from time to time. SEE SKETCH for one version. These F's are obviously flying intention movements or derived from them. Probably semi-ritualized. But not very rigidly stereotyped.

They may be accompanied by some fluffing of throat feathers. Again see sketch.

I also hear a few rather short semi-Rattling Chatters from time to time. These are difficult to distinguish for a peculiar reason. There is also a group of Purpurs in tree. And they are uttering some of their usual "Auh" Notes and Chatters. But I think that some of the Chattering sounds in the tree have a peculiar tone as well as form. They are loud and metallic sounding as well as rather short and semi-Rattling. It is these that are probably uttered by the Naevius. See also below.

A pair of Black bills also flies into tree in the midst of the hubbub. They, at least, are silent.

I did not see any overt interaction among inds. of different species. But it is quite possible that both the Purpurs and the Black-bills were drawn by the Naevius activity. Monitoring.

The Naevius dispute lasts at least 10 mins.

At one point, one ind. flies out of the baobab into another tree about 30-40 ft away. Flight with definite aerial display(s). The bird begins by doing (approximately) 3 rises and descents. Both very short and shallow, only a few feet. Rising on beating wings, descents in Glides. I think the bird is silent during this phase, but it could have been uttering "Uuh" Notes and/or Doublets. Then it suddenly starts to Rock, in level flight, with loud semi-screaming "Auh" Notes as it comes in to land. And then does silent Tailraise, quite extreme and Abyssinian like immediately after landing!

Eventually this bird flies back to the baobab. No rises or descents this time. But it does Rock as it comes in. This Rocking is, I think, silent.

A minute or so later, one bird flies away, silently. Out of sight. Then 2 birds fly away together. In same general direction. One of them utters 2 rather loud "Aruh" Notes, followed by short, hard, metallic Chatter, as they go.

Then I start to write up.

COMMENTS: Obviously Naevius are at least moderately abundant here now. Have they just arrived? Are they also common in other parts of the Casamance? Have I just been looking for them in the wrong environments?

How do they sort themselves out from Bluebellies? Such as they are, my observations here would suggest that Bluebellies and Naevius may be separated microgeographically.

The ritualized postures and movements of Naevius are quite reminiscent of other species of Coracias.

Their sounds are reminiscent of both Coracias and Lilacs. But quite complex and varied. Especially in tone (and loudness). Perhaps I can distinguish the following categories. Provisionally.

(1) and possibly (2). "Ark" Notes and "Umk" Notes. Single, or in short series, or in Doublets. Emphasis in Doublets (and in Quadruplets) on last note.

(3) Some emphasized last notes are "Aonk"s. Obviously higher intensity in some sense.

(4) Also high intensity are loud "Ank" or "Avnk" Notes. Sometimes semi-Screaming. Perhaps essentially identical with "Aonk"s?

(5) Metallic semi-Rattling Chatters are more distinctive, at least in form.

It may well be significant that I did not see any "copulatory" patterns during the dispute among the Naevius.

While I am writing these notes, ca. 9:55-10:00 a.m., I look up to see 3 Bluebellies in top dead, broken off, R palm near house. (Note: this is at least several thousand meters from where the Naevius were seen.) They also are engaged in a dispute. My attention is drawn to them by hearing several soft, "muffled", Rattling Chatters. 2 of the birds are perched on edges of cavity at top of tree. The third is hanging on side of trunk a few inches lower down. The birds are obviously tense. Lots of Agg V, with neck Fluffing, Looking (down), HD, Looking Away (single HF), etc. Also a few more muffled Rattling Chatters. Once one bird flies up and either hovers on beating wings and/or tries to mount another. (This could well be a "copulation" attempt. But it could also be simply an attempt to change position in the crowded circumstances. Certainly there is no trace of any "reversal"!) Then the birds are scattered. By my

approach and also by the appearance of a herd of cattle. Fly into different neighbouring trees. Then from tree to tree. One ind. does aerial display between trees. A shallow Rise with beating wings and a muffled Rattling Chatter followed by a silent Gliding descent. Glide also shallow. Then bird proceeds in ordinary level flight.

Coming back to Ziguinchor in afternoon. Start 1:15 pm.

We see one more Naevius just outside Katmong. Then no more. This is not necessarily very significant per se (the road from Katmong is so bad that I could hardly take my eyes off it); but we did see several Abyssinians along the highway as we got nearer to the marsh and Bac

Ziguinchor,
December [illegible],
1976

Going to work along road to Kolda this morning. Mostly for photos and censors. Weather clear and cool.

8:00 a.m. Region where X fens were studied some weeks ago. Nothing of interest visible or audible here at the moment.

Some distance further on, see single Abyssinian in tree.

Then a Pied in mangrove.

Arrive Magnus 8:35. See Bluebell perched in one of the usual trees. Then another in bush by partly dried pond. This ind. flies down to ground. Up again.

Then see 2 Purpures in top leafless Baobab. Sit together. Perhaps a trace of Allogrooming. Then one flies 2 ft away. Both do Rattling Chatters with Bowing. Back to back. Then 3 more Purpures fly in. Lots of Rattling Chatters with Bowing. Then a single Redbill flies in, lands approx. 2 ft below Purpures. Purpures fly off immediately. Is this a "supplant"? Possibly yes. Redbill sits quietly. Then flies off in general direction taken by the Purpures.

What in the world is a Redbill doing here?

There is at least 1 Cuin in shrubs by pond as usual.

We approach Bluebellies more closely. 2 in one tree, a third in another tree 30 ft away. The latter utters several "real" chatters as we approach. "Chaah chuh chuh" and "Chaaah chuh chuh chuh". Then all fly away. In more or less same direction. The ind. that uttered chatters does aerial display. Flies up several yards, then plummets down, almost vertically, several yards. Wings almost folded during plummet. Then straightens out. Aerial display is silent throughout.

The "real" chatter of this species can certainly be alarm and/or warning!

9.05. One Bluebelly hops along ground edge pond. Probes or pecks into earth or mud several times. Then just sits happily on ground. Looking around. Finally flies off.

At times, this species is almost a ground-roller!

Leaving this area 9:10 am

Drive further along road to Holda. In "uplands", some with millet. All we see in the way of rollers is Abyssinians. But lots of them.

Stop one area where 2 pairs of Abyssinians seem to be engaged in territorial dispute. Much chasing with "Arrh" notes. Also repeated high intensity aerial displays in more or less usual forms. One Abyssinian also chases crow, then peels off and does aerial display. No trace of "copulatory" patterns. It is beginning to appear definite that this species does not use "pseudosexual" patterns during hostile encounters.

Lots of Blackbill Whistles in distance.

Going on further still.

Photos Reds.

Then see pair Redbills flying over marshy area. The 2 inds. land in top small tree. Are Redbills moving in now? Are they taking advantage of mudflats exposed by drying waters???

Then see another Redbill in R palm not far away.

Also several kites hunting over mangrove

There certainly has been some migration into the region!

All the Redbills are being quiet. Silent in fact

Coming back, we see a group of Crowned Cranes in marsh by Maguis. Mass migration!

While I photos cranes, I hear bee-eater breaks. But I can't see birds flying overhead? Then I see single Whiteface. Perched 2½-3 ft up in small bush, by sand flat by mangrove. Actually eating a wasp of some sort.

COMMENT: Even though there has been immigration by other species, there still do not seem to be any Naevius here. This would suggest that they are (and perhaps have been) largely restricted to the region north of the Casamance River by ecological factors. Rainfall ??? (Note: the restriction can not be complete or absolutely continuous. There are records of Naevius from the Parc de la Basse Casamance.)

Ziguinchor
December 7
1976

Going to Talmere in afternoon. Take 3:00 p.m. Bac.

See at least one Persian over mangrove far side river.

Then Pieds in usual area. And a Lilac and an Abyssinian along the road. All more or less quiet. Weather is very oppressive.

Arrive Talmere itself 3:45 p.m.

See a single Blackbell, silent and alone, flying from baobab to baobab over scrubby field.

4:00 p.m. See single Bluebell, perched 25 ft up in baobab over field. Silent. Alone. Then hear semi-Rattling chatters not far away. Second Bluebelly flies up, past first. No response. Second goes on, out of sight.

See another Black bell fly by silently.

Some distance further on, see single Yellowbell perched, silent and alone in dead dicot by R palm plantation. Then hear Yellowbell Single Whistles, followed by Single-Triple performance, in distance. No Blackbells visible or audible at the time.

Then see several more Yellowbells same general area.

They fly away, disturbed by passer-by.

Then a couple of Purpures fly by, silently.

Then a Blackbill flies in to midst of area where Yellowbills seen earlier. Silent and alone. No Yellowbills audible or visible at the time.
So far, the social segregation seems to be very good here!!!
As usual, no one pays any attention to Crimsons.
Go into small patch "forest" 4:23. Hear Bluebell Rattle-Slur at edge.
4:40. More Yellowbill voice. No other hornbill visible or audible.
4:45. O & K see what may be pair of Naevius in "grove" trees between abandoned fields. This is Bluebell-type habitat, although I have not seen any Bluebellies in this particular spot. When I arrive a few minutes later, I can't find the presumed Naevius. But there is general confusion all around. Involving 2 spp. of birds of prey, crows, a group of Purpurs, at least one Bluebell, and at least one Lilac. None of the Coraciiformes is close to another. Things quiet down when some of the hawks move off.
4:56. Lilac is hawking for insects high (200 ft?) in air.
Some of the Purpurs here certainly are juvenile.
Lilac lands 80-90 ft up tall dead. Sits quietly. Apparently ignores 2 Purpurs 30-40 ft away, and also Bluebell 150-200 ft away.
5:08. Lilac just looks, turning head, when Purpur flies by only a few feet away. Both birds quite silent.
See another Bluebell several thousand m on "other" side of Lilac. COMMENT: it looks as if Lilac and Bluebell territories may be largely or completely overlapping. But the Bluebellies seem to be staying lower than the Lilac. From ground to 20 ft up. Whether this (also) involves social segregation is difficult to say.
Stop observations 5:30 pm.

Ziguinchor,
December 9,
1976

Driving back to Dakar today.
Ca. 8:00 a.m., not far past Palmeri, see a single Hoopoe (Upupa) on ground edge road.

Lots of Abyssinians seen, mostly "upland" areas, south of the Gambia. Also a few Bluebellies. No Naevius noted

Just north of the Gambia, before Moro le Rip, we came across even greater concentrations of Abyssinians. 3-4 inds, at least once 5 inds., in same trees. Inds. only a few feet or yards apart from one another within same tree. Trees containing different groups of Abyssinians only a few hundred yards from one another. Perhaps the birds were on migration? Or perhaps they were concentrated at particularly good food sources? Note: it may be significant that much of the vegetation had been recently burned in this area. Could this have made insects more easily available.

We also saw 2 dead Abyssinians on road. Apparently struck by cars.

We did not see any Senegals on wires before M'Bour